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I

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Throughout the Index the following abbreviations are used to indicate the nature of the references:—

**(Pat.) Patent News. (Cor.) Correspondence. (Soc.) Societies' Meetings. (Rev.) Review or Trade Notice,
(Ans.) Answers. (Anal.) Analecta.**

The Index includes several Sub-Indexes—

Bankruptcies, Companies Registered, Exhibitions, Names and Marks, Trade, Obituary, Patents (Authors of),

which are placed in their alphabetical positions.

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One-and-Six, and Good Value at That.

This is what the *Newspaper World* says of the Almanac. It hasn't seen a copy, for the first complete copy will not be available for a week or so, but nevertheless it is ready to pledge itself that the Almanac will be worth buying at a 50 per cent. increase of price.

And the *Newspaper World*, which week by week betrays its close sense of how Fleet Street lives and moves and has its being, knows that it can safely say so. How does it know that? Well, with the journalist's insight, it realises that in these hard times, with paper costing 400 per cent. more, there are only two things for the publisher of a rather fat book like the Almanac to do:—(1) Suppress its issue except to the extent of maintaining the copyright, or (2) make a decent thing of it, and bring it out at a price which is some set-off against the enormously increased cost.

That is, in fact, just how a publisher will look at the proposition in these days of paper rations—and paper prices! Ordinary standards of policy are knocked as high as a kite. It is not a question which of two alternatives pays better. There is probably not much to choose between the two in that respect. Six Almanacs for copyright purposes are a certainty in the way of avoiding loss: 15,000 for sale *may* make a few pounds.

Thus, in deciding on the latter, the publishers say:—"While we can produce a really good Almanac, fully worth its price, we will produce it. When we absolutely can't will be time enough to stop."

So the 1918 Almanac will come to its readers with a certificate of merit written, so to speak, in the circumstances of the time. It will be a good one simply because it wouldn't have been worth while to work for, say, four months on a job which after all couldn't be done well. In short, we would rather yield to the pressure of the times than offer a book which should disappoint a single reader of its many annual predecessors.

EX CATHEDRA.

Damp-Proof Showcases. The present persistent spell of penetratingly damp weather, or perhaps we ought to say the alternations of damp and frost, which are worse still, make it expedient to give an eye to showcases which are situated away from a studio, and, often from their exposed position, are particularly liable to suffer from influences of the weather. In many instances such show-cases are little better than heavily-built picture frames, and are in no way competent to withstand the ingress of moisture. The present seems an appropriate time when photographers could overhaul these pieces of advertisement apparatus; not infrequently they would find that they could very greatly improve them. We regard as an essential feature of such a show-case the provision of means by which the complete display can be removed in a few seconds, and its place taken by a fresh set. If this can be done by sandwiching the mounted photographs between two sheets of glass which are bound together passe-partout fashion the trouble from damp will largely disappear at the same time. It is not difficult to adapt an existing show-case to this system, and in designing new ones it is a comparatively simple matter to provide a fairly substantial foundation for the back part of the case and to form the front with a picture frame of fairly heavy moulding, within the rebate of which the specimens in their passe-partout binding can be inserted and retained in place by one or two turn-buttons. A lock and key for the front frame, which is hinged to the foundation, then completes the appliance, the damp-proof qualities of which may be further enhanced by providing facings of rubber on the rebated front of the foundation and on the back of the frame, and adjusted so that the pressure on the latter when the whole is locked brings the two into firm contact.

* * *

Copyright ipso facto. Although the main provisions of the 1911 Copyright Act appear to have become familiar to photographers, it is somewhat strange that the one point in regard to which we receive perhaps more queries than upon any other marks almost the most fundamental difference between the present and the previous legislation. It is that no registration or any other formality is necessary in order to secure copyright in a photograph or any other form of artistic work. Many of our inquirers seem to think that they are in a position of insecurity unless and until they have done something which is akin to the registration at Stationers' Hall, which was a necessary formality under the old Act in the creation of copyright as an asset in the eyes of the law. Let them reassure themselves. Under the present Act it is not necessary to do anything. The very fact of taking a photograph automatically creates the copyright in it. The question is to whom does the copyright belong? And here photographers are on familiar ground, because, with certain minor qualifications, the new Act is on all fours with the old, inasmuch as the copyright in a photograph which is ordered by any person becomes the property of that person, whereas if the work is done by the photographer "on his own" the copyright is his. These and the score of other less simple points which crop up in copyright law are exhaustively dealt with in the shilling manual "Photographic Copyright," which our publishers issue. Apparently photographers purchase it when they find themselves in some difficulty—then to discover that they would have been pounds in pocket by an earlier knowledge of its pages.

* * *

Making a Name. A point which is overlooked by many photographers is the value of a name which is a household word in the mouths of the public, at least in their own locality. If a man depends upon his show-case and the recommendation of his *clientèle* he may do a fairly satisfactory business, but he is in the crowd, and must take his chance with others. If, however, he has managed to bring his name prominently before the general public, the person who wants a portrait is very likely to seek him out because he has an idea that he is dealing with a prominent member of the profession, and, therefore, likely to get satisfactory work. Such a reputation can be gained, firstly, by doing good work and giving willing service to all comers, and then every chance, no matter how small, of gaining desirable publicity must be seized. Municipal work on town councils, school boards, relief committees, and the like contribute greatly to the desired end, and an occasional letter written to the Press on any subject of the day is another stepping-stone to the same point. If people constantly see sensible letters on any subject, from food queues to archæology, signed with the same name, they are likely to inquire as to the identity of the writer. If Algernon Ashton and the Rev. J. Bacon Phillips happened to have been photographers the notability they attained by their letter writing would have been worth much from a business point of view. Day by day a careful look-out must be kept for openings for self-advertisement, and no chance however small allowed to pass.

* * *

Doretypes. On another page we reprint particulars of a process which is just now being put before photographers in the United States as a means of providing a form of portrait photograph of rich distinctive appearance, yet capable of being produced at a comparatively low cost. The aim of the promoters has evidently been to originate something which in its way can be prized by the possessor just as the Daguerreotype miniatures were prized in their day. After one has discounted the familiarity of the public with all kinds and descriptions of photograph, it would certainly seem that there is still a promising field for originality of this kind. Moreover, the new process has the good feature that it is not one which can be turned over to the tender mercies of any half-skilled maker of bromide prints, but calls for a degree of skill (in the making of the glass transparency) which sufficiently puts it out of the sphere of the cheap imitator. Like everything else, it can be done badly; but the results which the cheap man is likely to produce will hardly bear comparison with those which are easily producible by printers of experience. As we point out in some notes, in introducing the communication, there is nothing essentially new in the method, which is a resuscitation of a dodge which has been practised now and again by makers of prints for exhibition purposes.

* * *

Matt or Matte— One of our colleagues of the American photographic Press has recently written to us in terms of mild remonstrance as to our use of the word "matt" in description of printing papers of surface other than glossy. His objection to "matt" is that it is a German word, currently used not only in its photographic connection but in others, for example, as mate or checkmate, in chess. It is suggested that the form "matte" is preferable, and is the spelling which is commonly adopted in the United States. To our mind, however, the choice of one or the other is an item of such triviality that we cannot believe it to be of any real importance in contributing to the benefit of the trade in photographic printing papers among either ourselves or our friends in America. Personally we use "matt" because it has for so long a time been sanctioned by custom, and after looking up the synonyms and alternatives in the dictionaries we conclude that it would be difficult to justify the choice of a better form on grounds of etymology.

* * *

—and Gaslight. While we are upon this subject we wish we could prevail upon our American brethren to do something which will remove the ambiguity which exists in reference to the description of the printing papers, which perhaps are more used than any other, and have, in fact, their origin in the United States—we mean "gaslight." In the United States during the past few years, doubtless as the

SUMMARY.

In the United States prominence is just now being given to a form of photograph consisting of a thin toned positive transparency on glass backed by paper, silk, or a coating of bronze powder. Such photographs, in a choice setting, are recommended as a novelty for studios which can secure the good price which their appearance justifies. The name given to them is Doretype. (P. 4.)

Some notes on the diffusion of light, particularly in respect to the use of the various forms of artificial light in the studio, will be found on page 3.

We repeat, for the information of many who seem not to realise the fact, that copyright in a photograph is created (without any registration) by the making of the photograph itself. (P. 1.)

A contributor to "Assistants' Notes" describes how to repair book-form dark-slides which have become leaky at the junction of the two halves. (P. 9.)

We regret to announce the death of two well-known figures in photographic circles, those of Mr. F. A. Bridge, for many years Secretary of the Photographic Convention, and of Mr. C. A. Booty, one of the oldest commercial representatives connected with photography, and of late years associated with the sale and transfer of businesses. (P. 8.)

The making of a mosaic colour filter, of regular or irregular pattern, for screen-plate colour photography according to a two-colour process is the subject of a recent patent specification. (P. 9.)

A recent issue of the "Geographical Review" contains a valuable summary of the methods of surveying by means of a camera which of late years have been officially employed in Canada. (P. 5.)

"COLOUR PHOTOGRAPHY" SUPPLEMENT.

In a communication on photo-micrography in colours Dr. C. E. Kenneth Mees instances the special requirements of the photo-micrographer, and outlines a process, worked out in the Research Laboratory of the Eastman Kodak Company, which has been found suitable and practicable. (P. 1.)

The current instalment of the "Decennia Practica" of colour photography deals with various defects encountered in Autochrome transparencies, such as black spots, frilling, and predominant tint. It makes mention of preventives of these, and of remedies in the shape of pale tinting screens for use when viewing or projecting. (P. 3.)

It is reported from France that a new method of making a colour screen-film has been worked out by M. Dufay in association with MM. Lumière. (P. 4.)

result of the widespread use of electric light, the word "gaslight" as a description of the paper of which "Velox" was the original type has dropped out and its place has been taken by "developing" or "developing-out," often written as "D.O.P." (developing-out paper). There is thus created the suggestion that in the matter of development there is something different between gaslight paper and bromide paper, for the latter name still survives among writers on and makers of bromide-emulsion papers in America. And to swing round to our country again, cannot someone think of a generic name which can be applied to the now fairly numerous papers which as regards speed fall more or less definitely in a class by themselves between gaslight and bromide? Up to the present "slow bromide" appears to be the best general name which can be applied to these.

DIFFUSED LIGHT.

Light as used by the photographer may be broadly divided into two classes, direct and diffused. In the case of daylight these are exemplified by direct sunshine and by the light reflected by clouds, and in that of artificial light by the rays proceeding from an unscreened electric arc and those reflected from the same light by a white screen, the arc itself being invisible from the position of the subject. We are all familiar with the effect of these two lightings in portraiture, the direct sunlight giving the harsh lighting so often seen in snapshot portraits, while the reflected light gives a more or less soft illumination according to the degree of diffusion and the skill with which the light is manipulated. Between these two extremes there are many grades. Even the light from a white cloud will give what a photographer calls "over lighting" if some further diffusing arrangement is not employed, and many portraits are spoiled for this reason. Hence we have the predilection of many operators for a studio glazed with ground glass, or having the glass covered with waxed paper. Where direct sunlight falls upon the glass during working hours this is necessary, but movable screens covered with tracing paper, as employed by the late Mr. Valentine Blanchard, who successfully worked in a studio with a southern aspect, are much to be preferred. In dull weather, and at such times as the sun is not shining directly upon the glass, they may be removed, the exposure shortened, and more vigorous effects obtained.

Many inexperienced photographers fall into the error of thinking that harsh lighting may be remedied by using a reflector to illuminate the shadow side of the sitter, oblivious of the fact that it is not so much that the shadows are receiving too little light, but that the high lights that are receiving too much. A simple experiment will show if the illumination is sufficiently soft for ordinary portrait work. If we set up a rod, say, an ordinary walking-stick, about a foot in front of a white background and find that it casts a more or less clearly defined shadow it is a proof that the lighting is too concentrated. Such a light will cast a shadow of the nose upon the sitter's cheek, and probably show sharp shadows in the drapery. We must now either introduce further diffusion by means of a translucent screen, such as the ordinary circular head screen, or move the rod and background further from the light until the shadow is almost lost. It is usually in small studios that harsh lighting is most in evidence, as in them there is little space for moving the sitter. Hence, in such places the head screen is the only remedy. The tyro is often reluctant to do this, because he fears that such a reduction of light will entail a greatly increased exposure, but upon trial this will not be found the case. Anyhow, we must give enough exposure to yield the necessary detail in the shadows; and as these are illuminated by reflected light from a white screen or the walls of the studio, it will be found that little more exposure is necessary for this, while we can afford to give more prolonged development without causing the high lights to be blocked up. Skilful artists can do wonders with concentrated light, but the tyro will find the course we recommend a safe one.

It is often found that an operator who can do good work in a daylight studio fails when he attempts to use electric light, and he is apt to attribute his poor results to the nature of the illuminant rather than to his own want of knowledge of it. Taking as an example of concentrated light a single enclosed arc lamp, we shall find that when used without a screen we have sharp, clearly defined shadows. If we interpose a thickness of tracing paper near the lamp we shall still obtain decided shadows, but the outlines will be softer. If we introduce a head screen covered with thin muslin or tracing cloth the shadows will be soft and their outlines indefinite, while we are able to develop all shadow detail without losing the modelling in the lights. It should be noted that the nearer the head screen is brought to the sitter the more the intensity of the high-lights is reduced. In fact, it is possible to equalise the lighting on both sides of the face if desired. It must not be forgotten that a reflector must receive light before it can reflect it, so that the diffuser must not be placed so that it prevents light reaching it. Another useful method of securing a soft lighting with such a lamp is to place a white screen behind it, and to cut off all direct light by means of a saucer-shaped enamel reflector placed so as to cover the arc. It may be well to mention that the open arc is also capable of being used in this way, as well as in the familiar umbrella-shaped reflector. One important factor in lighting is that of distance. Even with reflected light alone it is possible to obtain cast shadows, and the remedy for these is either to place the sitter farther from the light or to interpose a diffusing screen, a very neat way of doing this being that employed in Marion's "North light."

Half-watt lamps form a class of their own, although to a certain extent they may be placed with arc lamps. A single high-power half-watt bulb requires treatment similar to an enclosed arc. It may be used either with diffusing screens, or the light may be directed upon a white screen by means of a hemispherical reflector. The great advantage of the half-watt system is to be found in the fact that a number of small lamps may be used, thus providing a large area of illumination without having to waste light through thick diffusors. Even half-watts, however, should never be used without at least one translucent screen, the metal reflectors supplied not being large enough to give alone the necessary diffusion. Here, again, the factor of distance comes in. If the lamps are far enough from the sitter the small diffusers supplied with them are sufficient, but if the lamps are placed close up hard lighting will result if no additional diffuser be used.

Mount Prices.—Messrs. W. Butcher and Sons, Camera House, Farringdon Avenue, London, E.C., announce that as from January 1, 1918, the following advances on the catalogue prices of their list issued January, 1917, will be made:—Plate Sunk Mounts, advance 100 per cent.; Mounting, Ticket and Duplex Boards, advance 125 per cent.; Marlboro, Regent and Linette Papers, advance 100 per cent.; Paste on Mounts, advance 75 per cent.; Slip in Mounts, advance 50 per cent. Gardee Envelopes. All Prices Withdrawn. Prices on application. Negative Bags and Envelopes, advance 150 per cent.; Book Post Wrappers, advance 200 per cent. A new catalogue is now in preparation in which all prices will be re-adjusted. The above advances will be charged pending the issue of the new catalogue.

THE DORETYPE—A DE LUXE STYLE OF PORTRAIT PHOTOGRAPH.

We are interested in noticing in the current issue of the "Photographic Journal of America" that the Eastman School of Professional Photography is just now popularising in an improved form an idea which will carry some of us back to exhibitions of the Royal Photographic Society of more than twenty years ago. The Doretype, as it is called, is a thin positive transparency on glass, the characteristic textural effect of which is obtained by backing it with silk or paper or even with a bronze powder. The method of its production is thus substantially the same as that of a photograph entitled "The Grand Turk" which was shown at the exhibition of the R.P.S. many years ago, and which at the time attracted considerable comment. The method, however, is now put forward as a means for making quite small photographs, which, by their novel character and by the appropriateness of their mounting, may form a novelty for photographers' showcases; at one and the same time inexpensive and easy to produce, yet capable of commanding a good price. The details which we reprint below will make it sufficiently clear within what range the Doretype is capable of variation.—Eds. "B.J."

The new style of picture, the "Doretype," which has recently been introduced to the photographic trade through the Eastman School of Professional Photography, has met with an unusual amount of favour from coast to coast.

Photographers who have taken up this new process with the idea of making every picture as attractive as the process permits have been successful. Doretypes sell at prices that ensure a good profit and permit the necessary amount of care to be given each piece of work.

The popularity of the Doretype is due to its unusual attractiveness, but the effectiveness of the picture depends in a great measure upon the setting it is given. The Doretypes shown at the Eastman School are mounted in handsome leather cases made specially for these pictures by Taprell, Loomis and Co. The pictures in themselves are beautiful, but a handsome case becomes a part of the picture and adds materially to its attractiveness and to the photographer's profit.

With edges simply bound or the picture mounted in a frame, even though it be the best frame you can buy, much of the attractiveness of the Doretype is lost. You would not think of framing a Daguerreotype and, like the Daguerreotype, the Doretype needs a fitting setting to show it to the best advantage.

The Doretype is a warm-toned, thin, positive image on glass, and receives its brilliancy from the material which is used to back it up. It lends itself to almost any treatment—may be backed with light-tinted papers or various shades of fine silk or satin, but the most satisfactory method is to coat the back of the transparency with a fine gold bronze.

The following instructions will give a fair idea of the method, and a few experiments will enable you to determine how the best results are secured.

The first requirement is a clear, thin positive from any good negative. From large negatives the positive should be made by reduction, as the most attractive Doretypes are in small sizes. Give full time and soft development, so that the positive will be thin but full of detail. If you must work from a flat negative, a "contrasty" developer will be required; if your negative is "contrasty," a soft developer will be required; while if you have a well-balanced normal negative, a normal developer will give you the best positive. The positive must be thin, because the effect of brilliancy is secured by the light reflected from the material used behind the positive. A Seed 23 plate will give the best result in making these positives.

When the positive has been developed, fixed and thoroughly washed, it should be re-developed in the re-developing solution recommended for giving sepia tones on Eastman bromide paper.

Make up stock solution as follows:—

No. 1.—Bleaching Solution.

Potassium ferricyanide	5 ozs.
Potassium bromide	5 ozs.
Water	120 ozs.

No. 2.—Re-Developing Solution.

Sulphide (not sulphite) of soda	5 ozs.
Water	60 ozs.

Prepare bleaching bath as follows:—

Stock solution No. 1	4 ozs.
Water	4 ozs.

Prepare re-developer as follows:—

Stock solution No. 2	1. oz.
Water	8 ozs.

Immerse the positive in the bleaching bath, letting it remain until only faint traces of the half-tones are left and the black of the shadows has disappeared. This operation will take about one minute. Rinse thoroughly in clean cold water. Place in re-developer solution until original detail returns (for about thirty seconds). Rinse thoroughly, then immerse for five minutes in a hardening bath composed of 1 oz. of the following hardener to 16 ozs. of water.

Water	5 ozs.
Sulphite of soda, E. K. Co.	1 oz.
No. 8 acetic acid (28 per cent.)	3 ozs.
Powdered alum	1 oz.

The re-developed positive is thoroughly washed and dried and very carefully spotted. It is now ready for backing. If silk is to be used, only the lightest shades and finest surfaces will be found suitable. If tinted paper is used, an enamelled or very smooth surface is best. Lay the positives on the material to see what the effect will be. If several positives of the same subject are developed to different strengths it will be easy to determine the best quality for Doretype results by placing the several positives side by side on the same material and comparing the results.

If Doretypes are to be tinted, transparent colours should be used, and these should be very carefully blended; too little colour is preferable to too much; a delicate tint against a light background will be found most pleasing. When silk is used as a background it should be backed up with cardboard, cotton, and paper. Cut a piece of cardboard the size of the positive, lay a piece of cotton batting on the cardboard, cover the cotton with a heavy sheet of white paper, and place the silk over this. Lay the positive on the silk, being careful to see that it it not wrinkled, and passe-partout the positive and backing together. By applying a slight pressure while binding the edges the cotton will hold the silk in good contact.

One of the most generally used methods of backing is to coat the film side of the positive with gold bronze. It is necessary to use care in selecting the bronze powder, as these pictures are very often small, and a coarse grade of powder will give a coarse grain to the picture. A dark gold bronze gives a dull effect that is not pleasing. The best effect is secured by using a very fine, natural-gold-colour bronze that will work very smoothly. In most cases this powder can be supplied by the photographic stock houses in 1-oz. packages under the name "Light gold photo-coating powder." This powder must be combined with a liquid, and it is important to use one that will not affect the silver deposit or the gelatine, and that is as nearly colourless as possible. The dark-coloured bronzing liquids change the colour of the bronze and the effect of brilliancy is lost. The best thing we have been able to find for liquefying bronze powder is lantern-slide film varnish. This varnish is colourless, dries in about thirty minutes, and does not affect the silver image or the gelatine. Use a small amount of the bronze powder, and add varnish until the mixture is about the consistency of thin paint. Apply it to the film side of the transparency with a flat camel-hair brush about ¾ inch wide, and allow to dry with the transparency lying perfectly flat. If the bronze shows brush-marks when dry it has been applied when too thick. The solution should be thin enough to flow together, should be applied quickly, and should not be gone over once the entire surface has been covered.

With this method the finished picture should also be backed and edges bound to protect it from moisture. If the positives have been properly handled the results will be as permanent as the silver image itself.

Don't make Doretypes in large sizes; don't show them except in appropriate cases; don't look upon them as cheap novelties. They should rank with miniatures, and they surely give you the opportunity to offer your trade something out of the ordinary for gift pictures.

PHOTOGRAPHIC SURVEYING IN CANADA.

[As we endeavoured to show in a recent editorial article, one effect of the recent rapid development of aerial navigation is almost bound to be the much more extensive application of the camera to surveying. The employment of an aeroplane as the "base" for a surveying camera opens up an altogether new development of what in the past in this country has been a very much neglected method of map-making. Among Italian and Austrian surveyors, no doubt as the result of the mountainous nature of a great deal of the terrain over which they have had to operate, photographic methods in the past have been studied in much greater detail, as they have also in Canada. While, so it seems to us, the methods will be very different (when operating from an aerial position) from those which have been employed with the camera on the earth, it may, nevertheless, be of value to record the following survey of the methods employed in Canada, which are described in a recent issue of the "Geographical Review." It may be hoped that in the future the Science of photogrammetry, or surveying with aid of photography, will enter upon a new era of usefulness, and will find its application in the mapping of still unrecorded portions of our possessions overseas.—Eds. "B.J."]

The accurate survey of broken and lofty mountains is a task as difficult as the geographic results are interesting. The methods employed have varied with available appropriations, the limitations of topographer and instrument, and the character of the relief. The military engineers of a number of European countries, notably Italy and Austria in their Alpine domains, have done admirable pioneer work. Although in practical use for nearly forty years,[*] the photographic method has been brought to a high state of perfection during the last ten or fifteen years. The following account gives an analysis both of the method and of its application to types of relief and climate that have baffled Dominion topographers ever since the survey of the rough lands of the western Cordillera was begun.

In Western Canada there are large areas of broken country varying in elevation from low rolling foothills to snow-clad mountain ranges rising ten to eleven thousand feet above sea-level. The mapping of such country offers many difficulties. Ordinary methods of survey are impossible, except for very limited areas, and almost prohibitive owing to excessive cost.

In order to meet these difficulties, the method of photographic surveying was adopted, in the year 1886, by Dr. E. Deville, Surveyor-General of Dominion Lands. In that year an extensive survey of the Rocky Mountains along the main line of the Canadian Pacific Railway was inaugurated. Since then the photographic method has been used in many localities.

Photographic surveying may be used in any class of country where the topographic features are sufficiently marked to appear clearly in the photographs. The method is, however, best adapted to rugged country, such as the high mountain ranges of British Columbia and Western Alberta. Here the season during which climbing may be accomplished with safety is short, and climatic conditions are often unfavourable. High winds, storms, clouds, and extreme cold are the rule, so that work must often be done hurriedly and under great difficulty.

On Canadian photographic surveys the essential instruments are a camera and a small transit. These instruments are of the simplest possible form. In this respect they show a marked contrast to the complicated designs of most European instruments.

The camera consists of an oblong metal box, open at one end and fitted into a strong outer wooden case. The metal box carries the lens and two sets of cross-levels which may be read through openings in the outer case. Inside the box there are two sets of diaphragms, and a shade is placed over the lens, when a plate is exposed, in order to eliminate all superfluous light. The instrument stands on a three-screw base, identical with that of the transit, so that the same tripod may be used for both. The camera may be used with the long side either horizontal or vertical. In the horizontal position the lens has a field of about fifty-one degrees and in the vertical of about thirty-six degrees. The extent of the field is shown by lines ruled on the case. The size of the plates is 4¾ × 6½ inches. The carrying case is made to hold the camera and twelve single plate holders. The total weight of the case with the camera and twelve plates is about twenty pounds.

The transit is a light instrument of the ordinary pattern, made by Troughton and Simms, London, with 3-inch horizontal and vertical circles reading to minutes. The tripod has extension legs, 3 ft. 4 inches long when extended, and 20 inches long when closed. When in use a bag is suspended between the legs and filled with stones, and the legs and bag are further blocked with stones so that it is rigid in any wind. For packing, the head is taken off and placed in the transit box, while the legs are placed in a canvas case designed to hold the box and the legs. The canvas case is fitted with shoulder straps for carrying. The total weight of the instrument complete is about fifteen pounds.

Owing to the excessive contrasts of Alpine scenery, ranging from snow in sunlight to deep and heavily timbered valleys in shadow, it would be impossible to get good photographs with an ordinary camera and lens. Moreover, there is always a certain amount of diffused light which tends to obscure the distant details. The remedy for the former is a plate having great latitude of exposure, and for the latter an orthochromatic plate with a yellow screen. In the last few years the Cramer

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[*] It may be of interest to note that one of the earliest applications of the method was made by W. Jordan in his survey of the oasis of Dakhel during Rohlfs's expedition to the Libyan Desert in 1873-74, mentioned the May *Review*, p. 349 and footnote 2.

"Slow Isochromatic" has been the plate principally used on Canadian surveys. The Seed "L Ortho" has also given good results. In the beginning of the season of 1915, the Canadian cameras were fitted with Tessar lenses and Wratten and Wainwright "G" filters. Along with these, Wratten and Wainwright "Panchromatic Plates" were used and gave satisfactory results.

When in the field, it is important to select those points which give the best views of the surrounding country. This does not mean that the highest peaks are always the best. In photographs taken from a very high peak, the surrounding country often appears dwarfed, and the details do not show up as well as those taken from a more moderate elevation. It must also be remembered that the higher the peak, the longer the ascent is likely to take, and the greater the likelihood of encountering sudden storms. Frequently very useful views may be obtained with little trouble from points of comparatively low altitude.

It is customary to take enough views from each peak to cover the complete circuit of the horizon. This means very little extra work for the surveyor in the field, and the extra views are often of assistance in the office. It seldom happens, however, that all the views can be taken from a single point. Usually one or more camera stations are required on different parts of the peak. As a rule these may be located by reading angles on them from the central point and measuring the distance with a light tape. Angles must be read on at least one well-defined point in each view, preferably on two. The angle of elevation or depression should also be read on these points, as it will serve to check the horizon line of the view if there should be any trouble in the office. It must also be constantly remembered throughout all field work that all the country to be mapped must be seen from at least two points which subtend angles great enough to give satisfactory intersections and not too great to permit easy recognition of the same points as they appear in corresponding photographs, taken in pairs, one from each station.

For plotting purposes, bromide enlargements, approximately 10 by 14 inches in size, are made from the negatives. To obtain satisfactory results, the enlarging must be very accurately done. This work is done at Ottawa with an enlarging camera made specially for the purpose.

In the office the triangulation is plotted by ordinary methods, depending on the nature of the control. This may vary from a precise triangulation to a reconnaissance survey, where the triangulation and the photography are carried on at the same time. Elevations of the stations and more prominent peaks are computed from the angles read in the field. Where necessary, corrections are made to allow for curvature and refraction.

Views from different stations showing the same country are then selected. Sufficient points are identified on each of two corresponding views, taken from the different stations, to show clearly the topography of the country. These points are then plotted on the plan and their elevations calculated from the photographs. Using these points as a guide, and with the photographs in front of him, the topographer is able to draw in his contours with an accuracy dependent chiefly on the number of points plotted and on the scale of his plan.

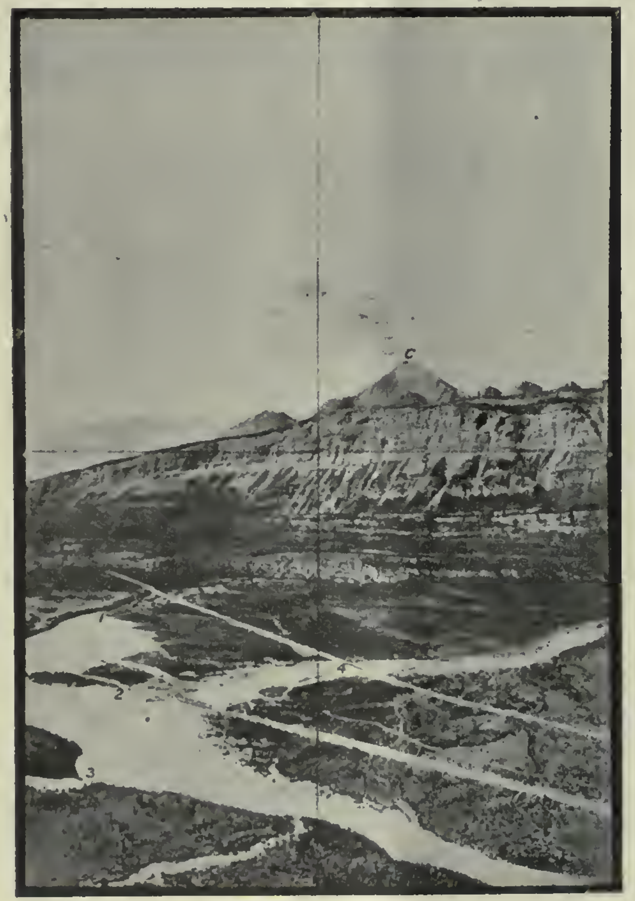

Fig. 1.

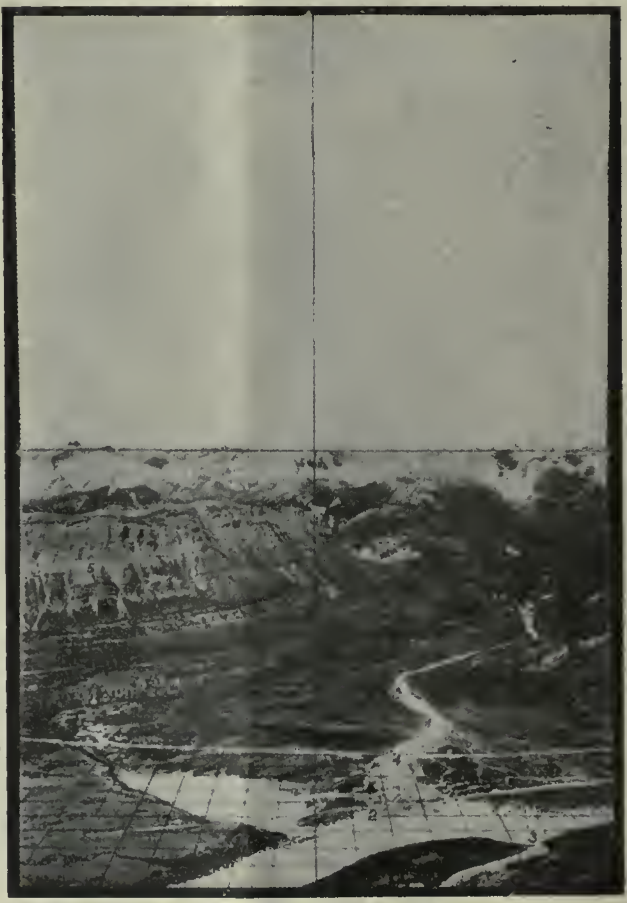

Fig. 2.

Figures 1 and 2. Two partially overlapping views of rugged topography in Jaspar Park in the Canadian Rocky Mountains, taken from two different stations with a camera equipped for photographic surveying. The relation of the two views is shown on figure 3. Figure 1 is taken from the station marked B, and figure 2 from the station marked A on that figure. The numerals 1 to 5 represent the same objects in both views and correspond with the points so numbered on figure 3. The ruled network in the foreground of figure 2 likewise corresponds with the network of squares in figure 3.

Figures 1 and 2 represent views from two stations shown as A and B in Figure 3. On these views, points 1 to 5 have been identified to illustrate the method of plotting. The principal and horizon lines, whose positions have been determined during the season, are first ruled on the views. The traces of the principal line and of the picture plane for each view are then laid down on the plan as shown. In Figure 3, aa, bb, and a'a and b'b' representing these traces respectively for Figures 2 and 1. the distances of the identified points from the principal line are then taken off on a slip of paper, a separate slip being used for each view. These slips are then placed on the traces of their respective views as shown by cc and c'c' in figure 3. The line of sight to any point is then given by drawing a straight line from the station to the projection of the point as shown in the slip. By inserting needles at A and B, and using fine silk threads or hairs instead of actually drawing lines on the plan from each station, the intersections may be determined very rapidly.

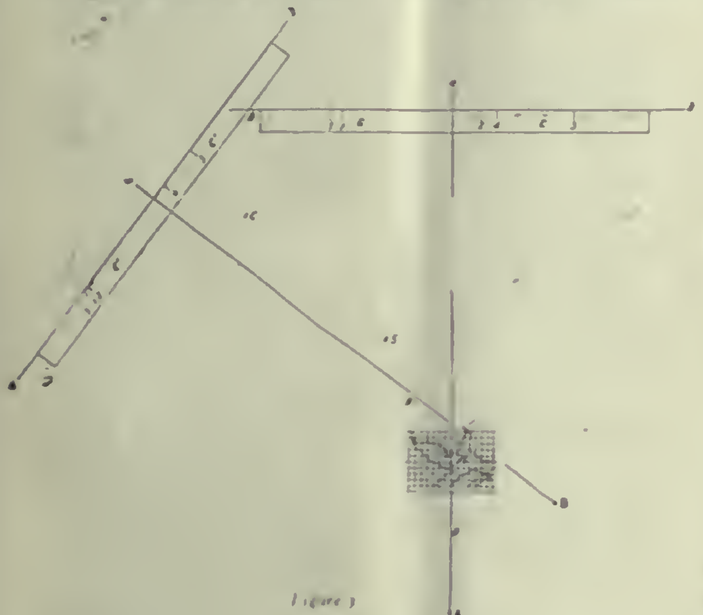

Fig. 3.

Diagram to illustrate the method of constructing a map from two photographic views. For explanation, see the text. In practice the distance from A to bb and from B to b'b' is made equal to the focal length of the views and the distances of 1, 2, 3, 4, 5, etc., from Aa and Ba' respectively are made equal to the distances of these points from the principal lines of the corresponding views.

The elevations of the points are taken out by means of the instrument shown in Figure 4, which was originally devised by Messrs. D. B. Dowling and H. Matheson, of the Canadian Geological Survey. The arms M and N are of brass, fastened rigidly together. P and Q are sliding bars, moving on the arm M. R is a swinging arm revolving around the centre O. P and R. are made of transparent celluloid, and on R a fine line rr is ruled, radiating from the centre O. The arm Q carries a scale corresponding to the scale of the map. The instrument must be made accurately, so that when the line rr is over the line s the reading of the scale will be constant when moved along the arm M.

When using this instrument the centre O is placed over the station. and the arm P is placed so that the edge coincides with the trace of the view, the line s falling on the principal line. The instrument is then held in place by heavy paper-weights. The distances of the points above or below the horizon as shown on the view are taken off on a slip of paper. The slip is then placed on P, as shown in the diagram, and held in position by the clips pp. The scale is now set to read the elevation of the station when the line rr is above s. To obtain the elevation of the point 5 the arm Q is moved to the point plotted, and R is moved so that rr passes through 5, as shown on the slip. The elevation of the point is now read directly off the scale. To avoid mistakes the elevation of each point is taken from the two views and the mean of the two elevations is used.

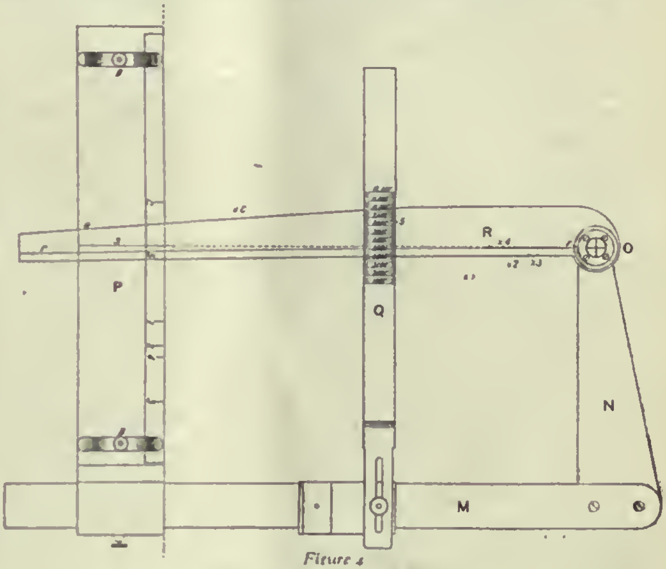

Fig. 4.

Diagram of instrument used in taking out elevations of the points as shown in fig. 3 (design of D. B. Dowling and H. Matheson, of the Canadian Geological Survey).

Relatively topographic features such as swamps, lakes, and rivers with comparatively small fall are plotted by means of the perspectometer. This consists of the perspective of a series of squares drawn on glass, having the distance line equal to the focal length of the photograph. The projection of the squares is laid down on the plan. the perspectometer is placed in its proper position on the photograph, and the outlines drawn in square by square. This method is illustrated in figures 2 and 3.

The accuracy of a photographic map depends first of all on the precision of the triangulation. After that, it is dependent on the number of camera stations and on the scale of the plan. Any scale or contour interval may be used. These will be determined by the purpose for which the map is required. For general purposes, the writer considers a contour interval of 100 feet and a scale of 1:40,000 the most convenient for a large plan. The precision is that of a good plane-table survey, but with the advantage that more points are plotted, and the contouring is done by the surveyor in the office, with the views from the different stations before him to which he can refer alternately, while with a plane table this simultaneous comparison is entirely wanting.

The most tedious and tiresome part of the work is plotting the points and drawing the contours. The office work requires at least twice as long as the field work. This is not a defect,

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Recent expositions of the subject are:

E. Deville: Photographic Surveying, including the Elements of Descriptive Geometry and Perspective. Ottawa, 1895.

J. A. Flemer: Phototopographic Methods and Instruments, Appendix No. 10 (pp. 619-735), Rept. Superintendent U.S. Coast and Geodetic Survey for Year ending with June, 1897. Washington, 1898.

A. Laussedat: Recherches sur les instruments, les méthodes et le dessin topographiques, Vol. 2 (in two parts). Gauthier-Villars, Paris, 1901 and 1903.

S. Finsterwalder: Die Photogrammetrie als Hilfsmittel der Geländeaufnahme, in "Anleitung zu wissenschaftlichen Beobachtungen auf Reisen," edit. by G. von Neumayer. 3rd edit., Jänecke, Hanover, 1906.

S. Finsterwalder: Photogrammetrie, in "Encyklopadie der mathematischen Wissenschaften," Vol. 6, 1, No. 1. Teubner, Leipzig, 1906.

W. Jordan: Handbuch der Vermessungskunde, Vol. 2, Chapter 16. 7th edit., Metzler, Stuttgart, 1908.

F. V. Thompson: Stereo-Photo Surveying, Geogr. Journ., Vol. 31, 1908, pp. 534-551.

H. M. Wilson: Topographic, Trigonometric, and Geodetic Surveying, Chapter 14. 3rd edit., Wiley, New York, 1912.

but one of the greatest advantages of the method, for the field work, which is most expensive, requires much less time than when any other method is used.

A party of seven can work to the best advantage under most circumstances. The party consists of the surveyor, his assistant, and five men, two of whom should be expert packers, if pack horses are used. With two sets of instruments, the surveyor and assistant surveyor, each accompanied by two men, are free to work in the same or different localities, the cook being left in charge of a main camp at some central point. Except on long or dangerous trips, one man is enough to accompany the surveyor when actually climbing. If in a country unusually difficult of access, extra help may be advisable.

As regards the cost of the work, it is impossible to give any accurate estimate. The cost depends, in the first place, on the nature and accessibility of the country, and, in the second place, on the class of work required. Much also depends on the season, as more or less time is always lost through smoky, cloudy, or rainy weather. The approximate cost of the writer's survey of the Crowsnest Forest Reserve in the years 1913-14 was $9.50 per square mile. This may be considered a fair average.

The following is a list of the principal photographic surveys made in Canada. The areas given are only approximate, particularly in the case of the earlier surveys.

Locality.	Area Surveyed in Sq. Miles.	Year.	Surveyor.
Main range of the Rocky Mountains adjacent to Canadian Pacific Railway..	2,500	1886—92	J. J. McArthur
Columbia River Valley from Revelstoke to Arrowhead	600	1897	J. J. McArthur
Alberta foothills south of Calgary........	2,000	1896—99	A. O. Wheeler
Crowsnest coal area, near Crowsnest Pass, B.C.	550	1900	A. O. Wheeler
Selkirk Mountains, adjacent to Canadian Pacific Railway, from Beavermouth to Revelstoke	1,100	1901—02	A. O. Wheeler
Rocky Mountains, adjacent to Canadian Pacific Railway, from Mt. Castle to Beavermouth	2,200	1903—06	A. O. Wheeler M. P. Bridgland
Rocky Mountains, Robson district, north of Yellowhead Pass....................	1,100	1911	A. O. Wheeler
Rocky Mountains, Banff-Windermere road from Vermilion Pass to the junction of the Kootenay and Vermilion Rivers	500	1913	R. D. McCaw
Crowsnest Forest Reserve, Southwestern Alberta	1,500	1913—14	M. P. Bridgland
British Columbia—Alberta boundary....	1,500	1913—15	A. O. Wheeler A. J. Campbell
Okanagan Lake district, British Columbia	1,000	1914—15	R. D. McCaw
Jasper Park adjacent to Grand Trunk Pacific Railway........................	800	1915	M. P. Bridgland
British Columbia—Alaska boundary	5,000	1893—1913	Dr. W. F. King
Southern boundary of British Columbia..	1,200	1903—05	J. J. McArthur
Yukon-Alaska Boundary (141st meridian)	1,000	1907—13	J. D. Craig
Thirty-one-Mile Lake watershed, Quebec	200	1913	D. H, Nelles
Reconnaissance surveys by the Geological Survey	9,000	1904—15	

M. P. BRIDGLAND.

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ROYAL PHOTOGRAPHIC SOCIETY.—The following members, out of ten who made application, have been elected to the Fellowship :—F. Bridgen, J. Aubourne Clarke, Bertram Cox, Miss Jessie F. Harvey, A. H. Lockington, E. W. Mellor, and A. E. Smith.

CONTROL OF LIGHTING.—A regulation (11A.) made under the Defence of the Realm Act states that the Ministry of Munitions may, with a view to maintaining or increasing the supply of light, heat, or power for the purpose of the production, repair, or transport of war material, or any other work necessary for the successful prosecution of the war, by Order direct that lights of any specified class or description shall be extinguished or their use restricted to such extent, between such hours, within such area, on such premises, and during such period as may be specified in the Order, and if any person having control of any light, or occupying, or having control of, or managing, or being in charge of premises in, on, or in connection with which any light is used acts in contravention of any such Order, he shall be guilty of a summary offence against these regulations.

DEATH OF MR. F. A. BRIDGE.

ONE of the most familiar personalities in photographic circles has been removed by the death of Mr. F. A. Bridge at Bognor on Saturday last, December 29. For some year or two past Mr. Bridge had been in failing health, and indeed had hardly ever shown his customary vigour and spirits since the death of his wife some seven years ago.

His business connection with photography was chiefly that of a commercial and technical photographer, of which branch of work he had made a specialty long before the days when "commercial photography" had become a recognised department of the photographic business. In this work he was something of a pioneer in the extensive use which he made of flashlight, in which connection his extensive series of photographs of the first London tube railways when in course of construction may be recalled. Although his technical work did not figure largely in the public eye—he himself was habitually somewhat reticent in regard to it—he nevertheless was certainly one of those who by their knowledge and skill have contributed to the establishment of photography as a documentary agent for legal and commercial purposes.

The Late Mr. F. A. Bridge.

But Mr. Bridge was more widely known in photographic circles first as one of the founders and afterwards as secretary of the Photographic Club and still more as general secretary, up to the time of his death, of the Photographic Convention. His support of the Photographic Club was consistently accorded until the demise of that body. In the early days of the dry-plate process, the Club was the chief medium for the personal interchange of experience in regard to the technicalities of all photographic processes. As, in course of time and with the development of gelatine emulsions, the making of dry-plates ceased to be a branch of amateur work and became an industry, the club outlasted its sphere of usefulness and almost all the members of its early days fell away from it. Mr. Bridge was almost the only one who supported it to the last and made the arrangements for the transfer of most of its assets and effects to the Royal Photographic Society. In Mr.

Bridge also the Photographic Convention of the United Kingdom found a secretary who for something like twenty years managed the annual summer meeting of that body with the utmost competence. No detail of the arrangements for the visit of two or three hundred people to Scotland, the West of England, or the Continent was too small for him. With the changes in the circumstances of photography, the character of the Convention meetings likewise underwent a change from the days of its establishment by the late J. Traill Taylor. The technical element became more or less subordinated to that of sight-seeing but everyone who has ever attended a Convention gathering will subscribe to the statement that a more indefatigable, thorough, and untiring secretary than Mr. Bridge could not have been had or imagined. He had identified himself so closely with the Convention, the last meeting of which was held at Perth in July, 1914, that it is difficult to see how, after the inevitable interruption created by the war, it can survive his loss.

In his early days Mr. Bridge was a singer of some considerable distinction. If our memory serves us correctly, he was a member of the Westminster Abbey choir, and up to middle life professional musical engagements throughout the country were part of his regular activities. In photographic circles, his hearty manner and the thoroughness with which he carried out anything which he undertook made for him a multitude of friends to whom his departure will be a real loss.

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DEATH OF MR. C. A BOOTY.

We regret to record the death on Christmas Day of Mr. Charles Abbott Booty who was undoubtedly the doyen of photographic representatives in this country, and probably could boast a longer connection with photography than any of his contemporaries. In years gone by he represented the firms of Elliott, of Jewin Street, Osborne's, of Red Lion Square, and other of the old supply houses. In that capacity he was a familiar and always welcome figure among photographers of the past generation. In later years he abandoned this occupation for that of dealing in photographic businesses, becoming senior partner in the firm of Abbott, Booty and Co. At the time of his death he was over 83 years of age.

Of his personal characteristics, one (Mr. J. W. Holder, of Croydon) to whom he was known for many years writes as follows:—"Mr. Booty was a native of Brighton, and in his early days conducted a studio and photographic supply stores at Oxford, which was very largely patronised by the University men. He used to relate that when little more than a boy the doctor gave him only a year to live owing to pronounced symptoms of consumption. He attributed his recovery and attainment of a vigorous old age to the continuous inhalation of the cyanide fumes from the fixing bath of "the good old days" of the wet collodion process. Almost to the last he retained remarkable activity, and possessed a wonderful memory of men and things. He was undoubtedly a very able lay lawyer, and his advice, as very many will recall, was freely given to photographers in all parts of the country. I myself have had experience of his good nature in this respect. He was also a fine amateur actor, and it was an entertainment to listen to his recitation of extracts from the classic pieces in which he was accustomed to perform in the past at Brighton. There he frequently met Dickens on the occasions of the novelist calling at the bookshop which his (Booty's) father kept at Brighton, and he frequently made mention of the great impression which the personality of the author of Pickwick made upon him. As the outcome of rheumatism he lost his voice, and for many years had not spoken above a loud whisper. He was accustomed jokingly to say how sympathetic people were when he called upon them until told that it was his natural voice. To a rare fund of humour—he had always a joke to crack—he added exceptional gifts as a raconteur, and was full of anecdotes and reminiscences drawn from a very full and varied experience. With all these attractive sides to his character he was, nevertheless, a first-rate man of business. He leaves a widow, two sons, and one granddaughter to mourn his loss, and will doubtless receive a kindly memorial in the hearts of many others to whom he was personally known."

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Repairing Leaky Book-Form Slides.

It frequently happens that the book-form pattern of double dark slide after some use (or it may be due to the shrinkage when improperly seasoned wood has been used in construction caused by damp or the action of the sun), admits light at the joint where the slide opens, with the result that the plates in the latter get fogged. There is no reason when this happens why the slide should be scrapped as I have recently proved by making a very simple though satisfactory repair which made the slide as light-proof as when it was first in use. Upon a careful test of the slide it was found that its condition was in every way satisfactory except at the point mentioned above, but for some reason a certain looseness of fitting was evident here, and I cast about for some means of preventing the light from entering by ensuring a tighter fit between the two halves when the slide is closed.

This was done very easily in the following way. I procured some odd strips of wash or "chamois leather" of the same length and width as the rebate of the slide. These were "seccotined" all round the latter, care being taken to secure a perfectly square join at the corners in order to prevent light entering here. The slide was then closed and put aside for the adhesive to get thoroughly dry. Upon testing, the slide was found to be in every way light-proof, and owing to the elasticity of the leather a much tighter fit was secured when the catches were in position. The leather was carefully dead blacked, more from the point of view of appearance than for any other reason. Upon another slide defective in the same way I tried strips of black velvet, but this does not answer quite so well, as it has not the elasticity of chamois. Any saddler would be glad to give or sell a few scraps of chamois leather for a few pence. Many photographers who have slides defective in this way while the draw-out shutters are perfectly light-proof, will welcome the above simple method of repairing what are really most expensive accessories, especially in large sizes.—Expert.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Colour Photography.—No. 110,993 (Jan 6, 1917).—The invention consists in a method for making a two-colour screen for use in the production of photographs in colours. To one side of a thin sheet of a colourless transparent material (glass or celluloid) a layer of transparent coloured particles is applied. The particles are all of one colour—for example, red; consequently, they arrest the passage of all rays of light except red rays. The particles are spread in such manner that interstices are left having approximately the same area as the particles. This layer of particles is then covered with a layer of colourless varnish for protection. On this layer, when dry, a layer of photographic emulsion sensitive to green and blue rays only, is spread. The emulsion is then exposed to white light in such manner that the light passes through the transparent base supporting the particles before affecting the emulsion. The result of this procedure is that the blue and green rays passing through the interstices affect the emulsion, and upon development a black deposit is formed behind the interstices. As the red particles arrest the passage of the blue and green rays, and the emulsion is only sensitive to such rays, no action occurs behind the red-coloured particles and the photographic emulsion behind the particles becomes transparent upon fixation. This black deposit behind the interstices is then changed by means of the photographic process well known as toning, into one of a blue-green colour—the complementary colour of the red particles. The method may be varied by staining the particles blue-green and toning the black deposit behind the interstices a red colour. In this case the sensitive emulsion would be that known as panchromatic, and the light would be a red one, or white light passed through a red filter.

When the screen is made up (as it may be) of printed dots or lines, the application to it of a panchromatic emulsion may be omitted, and the screen may be brought into close contact with a surface of panchromatic emulsion during the exposure. Before development of the exposed panchromatic surface takes place, the screen is removed. The latter is placed in its relative position on the positive when development is completed. The positive is made either by "reversing" the negative or printing separately.—Ernest Henry Tarlton. 42, East India Dock Road, Poplar, London, E.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Bee in B. Design.—No. 380,210. Photographs. Fred Rendell Burnett, 108, Renfield Street, Glasgow, photographer. October 18. 1917.

Analecta.

Extracts from our weekly and monthly contemporaries.

Colours with Sulphide Toning.

In theory (says a writer in "Photography and Focus" for January 2) the sulphide-toned bromide print should have the same colour, whether the image has been converted into silver sulphide by means of the hypo-alum bath, often called the "direct method," or by bleaching and darkening—"the indirect method"; but in practice it is found that the direct method gives a colder brown than is usually obtained by bleaching, and the colour is to most tastes pleasanter. It does not seem to be generally known that although the hypo-alum bath is generally used hot, in which case the toning is complete in about twenty minutes, it is quite as effective cold if sufficient time is given in which to do its work. About forty-eight hours in the cold will be found sufficient. The prints may be put into the solution face downwards and left, merely looking at them every twelve hours or so to see that they are progressing satisfactorily. There is no fear of over-toning, as action ceases when the change is complete; and if parts tone before the rest, it will be found that, given time enough, the slower parts catch up, and the final colour is uniform.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, January 7.

South London Photographic Society. "Carbon Demonstration." E. C. Ridge.
Dewsbury Photographic Society. Annual General Meeting.
City of London and Cripplegate Photographic Society. "Nooks and Corners of Old London." C. Forbes.

Tuesday, January 8.

Royal Photographic Society. "Bromide Printing." H. Essenhigh Cooke.
Birmingham Photographic Society. "The Riviera." H. R, Howell.
Stalybridge Photographic and Scientific Society. Lancashire and Cheshire Union Slides
Hanley Photographic Society. Y.M.C.A. "Photography and Focus," 1917 Prize Slides.

Wednesday, January 9.

Croydon Camera Club. "Enlarging on Bromide Paper." A. F. Catherine.
Photo-Micrographic Society. "Some Curiosities of Crustacean Life." F. Martin-Duncan F.R.M.S.
Edinburgh Photographic Society. Scottish Photographic Federation Portfolio.

Thursday, January 10.

Stockport Photographic Society. "The A B C of Picture-Making." J. Hurst.
Leigh Photographic Society. L. and C. P. Union Portfolios
Huddersfield Naturalist and Photographic Society. "Photography and Focus." Prize Slides.
Hull Photographic Society. Gramophone Entertainment.
Liverpool Amateur Photographic Association. "Scenes of Chinese Life." P. M. Roxby.

Correspondence.

∴ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

∴ *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE NEW ERA, LTD., AND THE P.P.A.

To the Editors.

Gentlemen,—Some months ago Mr. Archer Clarke, the original promoter of the company now styled the New Era, Ltd., at our request, wrote a letter appearing in the B.J. especially disclaiming that his proposed company had any connection with the P.P.A. As the prospectus of the New Era, Ltd., contains a statement as to the holding of the Preference shares by members of the P.P.A., which might lead to the conclusion that the company was not entirely dissociated from us, I am desired by my Council to point out that the fact that some of our members have subscribed for shares does not commit us in any way, as an association, to a connection with the company, official or otherwise. Our attitude towards the company is precisely the same as towards every other commercial undertaking providing photographic material—one of strict neutrality.—I am, etc.,

Alexander Mackie,
Hon. Sec., the Professional Photographers' Association.
December 27, 1917.

ASSISTANTS' UNIONS.

To the Editors.

Gentlemen,—The recent article by "Thermit" in the "B.J." of November 9, on photographic labour after the war, has aroused the inevitable suggestion of forming an assistants' union, and reference has been made to the influence that could be exerted by a powerful union. It seems, however, to be forgotten that a powerful union could hardly exist in the case of photography. When employees are reckoned by thousands or tens of thousands while the employers can only be counted by tens, as in the case of coal-miners and coal-mine owners, then a union of employees can be very powerful indeed; but when, as in the case of photography, the majority of employers have only one or two employees, a union is almost powerless, and can do next to nothing to benefit a single individual. In fact, a single employee, if only he has sufficient ability, is as powerful by himself as any union, and when we find such an individual who is a first-class worker, but yet is underpaid and overworked, it is pretty clear that he is himself very largely to blame. With a little more pluck and independence he could, in the majority of cases, get all from his employer that a union could get for him, and probably much more. With regard to the education of assistants, it would also be well to remember that the war itself is now educating many in the most practical fashion. Under the most adverse and difficult conditions thousands are being compelled to turn out work of a very fairly high technical standard. It is more probable that there will be a glut rather than a dearth of first-class darkroom assistants after the war; so this matter will be likely to right itself, while wages will almost surely follow the same course as in other trades, and be higher than before the war. Drastic methods of reform that are practically certain to lead to contention and trouble are, we think, best left alone until their necessity is proved, and it does not seem to be at all well proved at present.—Yours faithfully, Lux.

THE SENSITOMETRY OF PHOTOGRAPHIC PAPERS.

To the Editors.

Gentlemen,—Mr. Stinchfield's letter in your issue of December 14 contains, fortunately for me, one inaccuracy. He suggests that in my review I applied the word "invalidated" to the whole of the paper of Dr. Mees and his colleagues. As a matter of fact, the word does not occur at all in the review, but only in my last letter in your issue of November 9, and there it had reference only to "a good deal of the authors' conclusions as to the application of their results." Clearly, then, my criticism was directed against this application and not in any sense against the experimental work. On re-reading the review in the light of Mr. Stinchfield's letter, I find there is a possibility of a misunderstanding of my intention. After briefly referring to the experimental work and to the authors' discussion of the results, I said, "The value of the whole paper is, however, seriously depreciated by the neglect to take account of the fact that a paper is not necessarily intended to reproduce a negative, but, through a negative as intermediate stage, to reproduce the original." I was thinking in this sentence of the purpose of the paper as a whole, which I was certainly not alone in understanding to be not merely the recording of certain experimental results, but the provision of criteria by which to judge the quality of printing papers. This purpose I considered, and still consider, was not achieved, for the reasons I have already stated, and the contention is still further borne out by Dr. Mees' admission of the necessity for more work on the general question of tone reproduction in positives.

In so far, however, as the sentence I have quoted may have appeared to be adversely critical of the experimental methods and results given in the paper, I have great pleasure now in amending it. I do not think any valuable purpose will be gained by a discussion of further details of Mr. Stinchfield's letter.—Yours faithfully,

B. V. STORR.

26, The Square, Ilford, E.

Commercial & Legal Intelligence.

LEGAL NOTICES.—Notice is given that the names of the H. and R. Process Engraving Company, Limited, and the Photophore Syndicate Limited, have been struck off the Register of Joint Stock Companies, and are dissolved.

NEW COMPANIES

LOUVRE STUDIOS, LTD.—This private company was registered on December 22, with a capital of £100 in £1 shares (5 "founders or preference" and 95 ordinary). Objects: photographers, photographic and miniature artists, dealers in photographic accessories, jewellers, picture frame makers, art dealers, etc. The subscribers (each with one ordinary share) are:—Maria J. Taylour, Greencroft, Farnborough, Hants.; Helen B. Taylour, Greencroft, Farnborough, Hants. Manager: Helen B. Taylour. The preference or founders' shares are entitled to a fixed cumulative preferential dividend at 500 per cent. per annum, and each such shares confers 15 votes against one for each ordinary share. Registered office, 171a, Sloane Street, S.W.

THIRLWELL, LTD.—This private company was registered on December 22, with a capital of £6.000 in £1 shares. Objects: to acquire the business of photographers formerly carried on by R. Thirlwell and Raimes and Co. Ltd., as "Thirlwell and Co.," at 21, Bridge Road, Stockton-on-Tees, at Skinner Street, Darlington, at Church Square, West Hartlepool, at 39, Newgate Street, Bishop Auckland, at 89a, Northumberland Street, Newcastle-on-Tyne, and at 75, Linthorpe Road, Middlesbrough. The subscribers (each with one share) are:—R. Thirlwell, 36, Cranbourne Terrace, Stockton-on-Tees, photographer; J. Thirlwell, 36, Cranbourne Terrace, Stockton-on-Tees, photographer; F. T. Nattrass, Arleswicke, Hartburn Road, Stockton-on-Tees, director of Raimes and Co., Ltd. The first directors are:—R. Thirlwell, A. L. Raimes, J. Thirlwell and F. T. Nattrass (all permanent). Registered office: 21, Bridge Road, Stockton-on-Tees.

A. F. A. CHEMICAL CO., LTD.—This private company was registered on December 21, with a capital of £1,000 in £1 shares. Objects: perfumery chemists, manufacturers of and dealers in proprietary articles, pigments, photographic goods, etc. The subscribers (each with one share) are:—J. A. Ward, Westness, Sutton, Surrey, sales agent; J. N. Nicolai, 88, Sinclair Road, West Kensington, chemist perfumer. The first directors are:—J. N. Nicolai, J. A. Ward and F. School. Solicitors: Francis and Johnson, 19, Great Winchester Street, E.C.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

C. E. S.—We think you can get matted celluloid, under the name of "Norwich film," from dealers in process requisites, such as Griffins (Kemble Street, Kingsway) or Penrose's (109, Farringdon Road, E.C.). Failing these—we believe Norwich film comes from the U.S.A.—you should try Messrs. Rheinlander, New Malden, Surrey.

MACK.—We are sorry we cannot say much that is good of the retouching. Your touch seems fair; but you appear to have no idea where to put the work. You have smoothed out nearly all the gradation and left a very washed out effect. Without having seen a print from an unretouched negative we should guess that you had done too much work on it.

TINTED.—There is no book on the subject; the best particulars we can refer you to are contained in a catalogue which Messrs. Fallowfield, 146, Charing Cross Road, London, W.C., issued—and, we believe, still issue—dealing with multiple cameras, colours, rollers, and apparatus for celluloid surfacing. You might also write to Messrs. Rheinlander, New Malden, Surrey, who have some specialties of service in this branch.

J. P. S.—So far as we know, there is no truth whatever in the statement. We have heard of such things happening, but never in the circumstances such as those which you state. If the parties persist in repeating their insinuations, we should think that the address to them of a lawyer's letter pointing out that they are bringing themselves within the law of libel should be sufficient to stop them. Better to do this than to indulge in any retaliation.

H. T.—If you desire to register simply the artistic copyright in the drawing, then we would inform you that such is no longer necessary under the present Act. The drawing or design becomes automatically copyright from the fact of its creation. If, however, it is your idea that the drawing should be registered as a trade mark then that is out of our province: you require to apply to the Registrar of Trade Marks, 25, Southampton Buildings, Chancery Lane, London, W.C.2.

BESTO.—We are afraid there is nothing now to be done. It is a thousand pities that you did not make the purchase through our deposit system which is a perfect safeguard against disappointments and unsatisfactory dealings such as yours appears to be. The only thing you can do is to have a solicitor write to the people threatening them with action for misrepresentation, but unless you are prepared to go to the full length of taking out a summons in the County Court we should imagine that simply a threat of proceedings will not be very much good.

LINING WOODEN DISHES.—I have seen mentioned in the "B.J." a material for lining wooden dishes to render them suitable for fixing and washing prints. Would you kindly tell me the name of the material and where obtainable?—C. R.

We think you must refer to the material called "Ruberoid," which you can perhaps persuade a local firm of house decorators to supply you with, or possibly they could order a supply for you from the makers at the Brimsdown Works, Essex; but we believe the material is not supplied direct except to those more or less in the trade.

B.—If you mean for the making of side-lights in dark-rooms, a very good substitute is the gelatine sheets sold by Messrs. Brodie and Middleton, 79, Long Acre, London, W.C. These can be made up with tissue paper, if necessary, to form semi-transparent safelights. See article in last week's "B.J."

W. E. A.—It would be useless to give you a dry-plate emulsion formula without detailed directions (which would be too long for this column) for compounding it, washing, heating, etc. The best advice we can give you is to get one of the larger handbooks on photography, such as Abney's "Instruction in Photography," published by Messrs. Iliffe, price 7s. 6d., from which you will be able to gather how to compound and prepare an emulsion for a plate of moderate speed.

The Kit-Cat Size.—At an art club some time ago, and in the newspapers quite recently, mention was made of the "Kit-Cat" size and style of portraiture. Can you explain it?—B. W.

Kit-Cat portraits are three-quarter lengths, and measure 36 ins. by 28 ins. The size has not yet been recognised in photography, but it is fairly well known to artists of the brush. The size and style originated in the year 1703, when a club was founded at a mutton-pie house near Temple Bar, kept by one Christopher Cat, whose pies were humorously termed "Kit-Cats." The club was supported by many (forty-three) famous men of the period, each of whom presented to the founder, Jacob Tonson, a portrait painted in a special way and of a special size by Sir Godfrey Kneller. Hence the origin and size known even to-day as Kit-Cat. This interesting series of portraits still exists, it being last heard of at Bayfordbury, near Hertford.

History of Photography.—We shall be glad if you will kindly tell us if you know of any work dealing with the history of photography, or, if not, where we could get such information to enable a student to prepare a short paper on this subject to read before a literary and debating society at a public school.—A. H.

The best book for your friend is "Photography of To-day," published by the Seeley Service Company, or obtainable from our own publishers, price 6s. 5d., post free. We would refer you also to the issue of the "B.J." of June 19, 1914, which contains quite a complete history of photography, and is still obtainable from the publishers, price 4½d.

Costume.—1. It is a matter for the ruling of the Registrar of business names, but we should certainly say that coupons would come under the same category as receipts and will require to bear your real name as well as that under which you trade. 2. A very good little booklet on the Business Names Act is issued by Messrs. Jordan, law stationers, Chancery Lane, W.C., price 6d. 3. We believe the minimum fee for the registration of a company is £2, which includes companies up to a capital of £2,000, but there are other inland revenue fees, and the best thing you can do is to apply to the Secretary of Inland Revenue, Companies Registration Department, Somerset House, Strand, W.C.2.

Copyright.—My son, his wife and baby, had their photographs taken by a photographer, and paid for them at the rate of £6 6s. per dozen. Is the copyright my son's or the photographer's? Can I copy them for making enlargements, postcards, etc., without infringing the copyright, if the photographer's?—F. L. T.

If your son gave the order to the photographer in the ordinary way, and was not solicited by the photographer to come to the studio and to be photographed without liability for payment if, for example, he did not like the photographs, then the copyright is your son's, and you can do exactly what you like with the photographs in the way of having them copied, enlarged, etc.

N. B. E.—Although we are not lawyers, we certainly think that the insistence on all letters being re-addressed to the late proprietor—you do not say whether he traded under his own name or not—is certainly an act which constitutes a possible diversion of part of the business of the studio from yourself. Whether it is so in fact is a matter which we think would require to be proved before it would be possible to take successful action against him. Surely you must have found instances where people had first written about an order and then afterwards had called personally, you having then discovered that the letter had gone on to the former proprietor. One case of this kind would obviously put you in a strong position to restrain the former proprietor from continuing the practice.

C. S.—1. Certainly it is remarkable what can be done in the way of short exposures with a plate of the very slow speed of the Wratten Process panchromatic, particularly, in our experience, when using very small sizes of plates in a hand camera of vest-pocket size; but as you do not specify any particular apparatus for which you are using the plates, we should hesitate to say that you will benefit materially by substituting these slower plates for those you are at present using. 2. Certainly some of the cheaper between-lens shutters are liable to give different exposures, even while remaining set at the same speed marking. We do not think you can take it because you have the chart in question that it is a guarantee of the constancy of the exposures at any given speed marking. We have not had enough practical experience of the shutter you mention to be able to say whether it is perfectly satisfactory in these two respects. 3. Roll film can be further colour-sensitised, but we have no formula that we can give you. Extra sensitising of this kind is confined practically to cinematograph film, which is used for the various colour cinematography processes, for which it is extra-colour.

Copyright.—Can you tell me whether it is now necessary to mark photographs "copyright"? I have a lot of negatives which were registered under the old Act, and am issuing postcards of some of them. Does the proviso in the old Act as regards marking them copyright apply equally under the new Act? I notice in a lot of the photographs that one sees about that there is no mention of copyright, but presume that this is because they have been made since the new Act came into force. Shall be grateful for any light you can throw upon this matter.—Amos Tibbett.

You are wrong in saying that under the old Act it was necessary to mark photographs "copyright." There was no such formality ordered by the old Act, nor is it necessary to use the mark "copyright" for photographs which have secured copyright under the 1911 Act. But there is now a very good reason indeed for so marking every photograph which is issued either as a single print or in number as postcards. This is that the 1911 Act contains a clause which in a measure exempts infringers who can show that they have no reason for supposing that copyright existed in the work (photographs, etc.) which they had infringed. Obviously the marking of a photograph "copyright" is some considerable defence against advantage being taken of this provision.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as "returns" are no longer accepted by the publishers. This step has become necessary owing to the further restrictions imposed by the Government on the importation of paper and paper-making materials and of the consequent shortage of supplies. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

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The Summary of contents which usually occupies the lower half of this column will be found at the foot of the page overleaf and will continue to be placed there whilst its regular position is required for notices relating to the forthcoming "B.J. Almanac."

Demand and Supply.

Year by year, since the dimly distant date of August, 1914, it has been necessary to adjust the production of the Almanac in accordance with the circumstances of the time. A year ago we issued only 20,000 Almanacs; they were all speedily bought. This year only 15,000 will be available, and at the time of writing pretty nearly the full number has been ordered by the trade distribution firms. The balance represents the supply (small) from which you, good reader, and others who, like you, have not yet placed an order, may secure a copy.

Let there be no mistake, a book such as the Almanac, particularly at its now increased prices of 1s. 6d. and 2s. 6d., is not ordered by dealers for chance sale. There is probably scarcely a copy among the thousands already ordered which is not, in fact, earmarked for somebody or other; that is to say, included in our publisher's large totals because somebody in Builth Wells or Brisbane months ago told his dealer to secure it. It is for this reason that we must counsel the reader to place a definite order if he wishes to make sure of the 1918 volume. We have urged this precaution in past years because of many instances of its necessity; it is even more needed in the present instance, when the edition has, perforce, been reduced by a further 25 per cent.

The editorial article in the forthcoming issue deals with Negative-making—development by tank and time; fixing; fixing-hardening; washing and hypo-eliminators; stain-removers and drying—largely in reference to present-day conditions. Circumstances of the time, such as labour and materials, have in a measure created new conditions which must have their counterpart in photographers' methods. The Almanac article is to be studied in this connection now and for the future.

EX CATHEDRA.

Economy in Hypo. As many of our readers have doubtless learnt for themselves during the past few weeks there is just now a shortage in this country of hyposulphite of soda solely in consequence of the large quantities of this chemical requisitioned for military purposes. Hypo, it may be recalled, is a mild antiseptic which has specific uses in this capacity and further is an important constituent of the anti-gas masks with which our soldiers protect themselves from the Germans. There is, however, no reason to believe that the shortage will be of more than short duration, yet at the same time it behoves every photographer in his own interest no less than in that of his colleagues throughout the country, to observe whatever economy in hypo is possible at the present juncture. In practice such economy will consist not so much in keeping baths in use up to the point of exhaustion but in maintaining a reasonable temperature—not below 60 degs. F.—of the fixing baths and in setting aside baths which have been used for the fixation of prints for after employment for plates where their progress towards a state of exhaustion can be readily followed.

* * *

White Backgrounds. Every now and again we receive applications for a formula for a mixture which can be applied to a background so as to secure the practically opaque deposit on the negative, which is the desideratum for sketch portraits. It may, therefore, be said that beyond adding a little blue to the ordinary white distemper nothing can be done in this direction which is of any material advantage. The intensity of deposit in the negative must be secured almost entirely by correct illumination. Very often the background is so lighted that if it were made of freshly fallen snow it would still phototgraph as grey in the negative. There seems often to be a failure to realise that the soft lighting which the sitter requires to receive for the making of a sketch portrait must not extend also to the background. To get one type of lighting in one place and another in another it is necessary to place the background further away, and by adjustment of blinds (in a daylight studio) or of lamps (in one where artificial light is employed) to secure much more intense lighting on the ground itself. Often enough in a daylight studio the photographer is handicapped by the fact that his glazing does not extend back to the level where the background is usually placed. The conditions then are exactly the opposite of those which are favourable to the lighting of sitter and ground for sketch work. The remedy, obviously, is to bring the background several feet forward, so as to receive ample illumination and to supplement the subduing effect of side blinds upon the sitter by means of head-screens or the like.

Buried Treasures. We have many photographic exhibitions, in every one of which there are at least a few pictures which should find a more extended market than that offered by the exhibition itself. A correspondent in the colonies recently inquired where he could purchase duplicates of certain photographs by well-known exhibitors, and all that could be done was to refer him to the artists themselves. Surely, it would seem that the time has come when pictures by photography should take their places in the picture-sellers' windows as they did in the earlier days of the art. Their evanescent character caused their downfall in those days, but now platinum, carbon, and Bromoil can challenge engravings and drawings on the score of permanence the question becomes one of artistic merit alone. The fact that only limited numbers could be produced if the exhibition standard is to be maintained would enhance the value of the prints and create a demand among serious collectors. As it is many art-lovers have no idea of the possibilities of modern photography, except that gained from the illustrated papers or the portraitist show case. They have never visited a photographic exhibition, they have a quite erroneous notion that the Salon is the refuge of the Cubists and Futurists of photography, and in extreme cases that photographs are still shiny things that fade. There is an opportunity for an enterprising print-seller to undeceive them!

* * *

White Image Developer. One of the things the supply of which, apparently, has been more or less completely cut off by the war, is the developing solution which is employed for the making of the direct positives on ferrotype plates, which are still a form of street-corner photography, which continues to have its vogue. The characteristic of this developer is that the image which it yields is relatively white instead of black, or, at any rate, is of a degree of whiteness which is sufficient for purposes of contrast against the black of the ferrotype plate. A year or two ago the Vanguard Company, which previously marketed a developing solution of this kind, published the formula for it in our columns, and it may, therefore, be of service to some if we again reproduce it. It is:—A. Soda sulphite, dry, 3½ ozs.; water, hot, to make 16 ozs. While hot add hydroquinone 120 grains. B. Ammonium chloride, 3¼ ozs.; ammonium bromide, 40 grains; hot water, 16 ozs. Solution B is added to solution A, addition then made of 2 ozs. fluid of strongest liquor ammonia and the whole then filtered. This mixture then forms the working developing solution, which must not be further diluted with water. It can be used over and over again until more or less exhausted, and in fact works better after a time than when freshly mixed. The plates should be fixed in an ordinary clean hypo bath.

SCIENCE AND PRACTICE IN THE FIXING OF PRINTS.

The further paper by Mr. A. W. Warwick, which we print upon another page, continues, as will be seen, the record of this very capable experimenter's work on the process of fixation—this time in the process of fixing prints. Broadly speaking, Mr. Warwick's results are on all fours with those on the fixation of plates which we published in a recent issue. Their difference chiefly lies in the fact that, inasmuch as the emulsion coating on printing papers contains a very much smaller quantity of silver bromide fixing can take place—we say *can*—in a much shorter time on this account, and also for the further reason that the fixing solution gains access to the emulsion layer both from the front and through the more or less porous paper support. Thus measurements made of the action of the fixing bath at intervals first of five seconds, then of ten, thirty, and sixty seconds, showed that the quantity of silver bromide usually present in development papers is rendered completely soluble in from 15 to 20 seconds. Mr. Warwick confirmed this observation by the delicate sulphide test, according to which after fixing for 15 or 20 seconds, and then washing in several changes, the paper was found to give no dark spot when touched with a glass rod moistened with sulphide solution. Similarly, his experiments, as he has conducted them, show that practically the whole of the silver bromide is extracted from development papers by immersion in two successive 10 per cent. baths of hypo for 1½ minute in each.

On the basis of these tests we have the recommendation from Mr. Warwick that in fixing bromide and gaslight prints in a 10 per cent. hypo bath the time of immersion need not be for more than five minutes, and that ten minutes may be taken as an extreme length of time. It is suggested, in view of the fact that a sheet of development paper can be fully fixed by immersion for 15 or 20 seconds in a 20 per cent. hypo bath, that therefore makers' instructions to fix for as long as 15 or 20 minutes in a bath of this strength are ludicrously beside the mark. Here it is necessary to make the most emphatic distinction. Mr. Warwick, as his paper shows, operates on a single sheet of bromide or gaslight paper, and gives it his full attention in the way of promoting the full action of the hypo solution upon it. Such conditions are as far removed as they well can be from those which prevail in the fixing of prints as practised by either the amateur or professional photographer.

SUMMARY.

The presidential address to the Royal Photographic Society, which we print upon another page, took the form of a review of the recently past history of the Society in reference to its anciently professed aim of existing "for the advancement of photography." The address cites instances in which it is alleged that opportunities for pursuing this aim have been missed or neglected or have not been sought. On the other hand, putting aside this remissness in the past, it cannot be said that the address contains anything in the way of definitely constructive policy for the future. The instances which the president gave of the valuable photographic work which is being carried out by the photographic branch of the Royal Naval Air Service will be read with interest. (P. 17.)

In an editorial article we have something to say on the R.P.S. presidential address, particularly in respect to the fact that it is scarcely fair in classing equally the last ten or fifteen years with the period from about 1890 to 1900, which in some quarters is noisily proclaimed as the palmy days of the Society. (P. 15.)

Mr. A. W. Warwick has continued, in *American Photography*, to publish his valuable experiments on the process of fixation, this time in reference to the fixing of prints. He finds, under his experimental conditions, that prints are fully fixed within a time which is a very small fraction of that which is commonly accepted as necessary in ordinary practice. (P. 16.)

In a leading article we lay all the emphasis we can on the fact that the conditions under which Mr. Warwick's tests are made, *viz.*, the fixing of one print at a time in a given quantity of hypo solution, are altogether different from those which prevail in the handling of batches of prints which are being fixed in the ordinary course. For this reason we cannot accept his results as recommending much shorter times of fixation nor as confirming his suggestions that imperfect fixing is less commonly the cause of stains in prints than insufficient washing. (P. 14.)

We regret to record the death of Mr. George C. Whitfield, financial founder of the Paget Prize Plate Co (P. 21.)

A correspondent recalls his own method of producing effects similar to those of the Doretype described last week. (P. 22.)

In view of the present scarcity of hypo, economy of this chemical is desirable, and may be most efficiently practised by seeing to the temperature of fixing baths and by utilising those which have been employed for prints afterwards for plates. (P. 14.)

The British Industries Fair in London and Glasgow has been postponed for two weeks. (P. 22.)

In ordinary working a mass of prints is dumped down in the fixing bath, and often enough left to take its chance of complete fixation without the highly necessary operation of exposing prints singly to the action of the bath by continuously bringing the bottom one to the top. In those circumstances there is no ground for supposing that the speed of fixation of any particular print is anything like the figures which Mr. Warwick obtains. The conditions are against rapid fixation, for they include strong pressure of one print against another (thus hindering the access of the hypo solution), and also the partial exhaustion of the solvent powers of the bath. On the ground of his tests, Mr. Warwick is inclined to make light of the suggestion which is often made that more prints are spoiled through insufficient fixation than from insufficient washing. But his tests, divorced as they are from everyday working conditions, do not in any way support his contention. On the other hand, we can certainly say that practical experience amply justifies the view that insufficient fixation is the cause of most of the stains and markings which afflict development prints. By insufficient fixation we mean not chiefly fixation for an insufficient time, but omission to keep prints constantly fully exposed to the fixing bath. We have had plenty of opportunities during the last three years of proving to our own satisfaction the very complete fixation and the absence of after-troubles which result from the use of two fixing baths in succession. The other day, on visiting the printing room of a West End photographer whose work ranks among the best, we were pleased to find that the doctrine of two fixing baths which we have preached in and out of season for a long time past had, in his case been further developed into the practice of using no less than three fixing baths, through all of which each batch of prints was passed.

THE ROYAL PHOTOGRAPHIC SOCIETY.

The President's address to the members of the Royal Photographic Society, which we print upon another page, is a call for the consideration of what more may be done by the Society in justification of its declared constitution of existing "for the advancement of photography." The address thus is essentially a document for the members of the R.P.S., yet the Society, by virtue of its importance as a public institution in photography, necessarily invokes the sympathetic interest of all who wish to see its influence grow, and who hold the conviction, as we do, that the R.P.S. should take a leading part in photographic affairs. Criticisms which of late years have been levelled at the Royal are mainly to the effect that it has localised its efforts, and in the main we think they are true. It can hardly be denied that the Royal has existed too largely for the members who enter the doors of its house, and too largely has ignored the general questions which affect photographers as a body and photography as a whole. If we may single out two instances which justify criticism of this kind, they are to be found, we think, in the attitude of inertia which the Royal has displayed in the matters of revision of legislation in copyright law and in that of survey and record work. Proprietary rights in their photographs is a thing which is of importance to all photographers; but the battles for an equitable dealing with copyright in photographs which took place whilst efforts were made to introduce various Bills into Parliament and to advance them to legislation were fought by the Professional Photographers' Association. Even when the new legislation became consolidated in the 1911 Copyright Act no action was taken by the Royal in the way of familiarising its members and photographers generally with the new legal provisions in respect of copyright. In like manner suggestion and practical measures connected with the archæologically important work of survey and record photography have come almost exclusively from societies other than the Royal, although the Royal, by its official linkage through the Affiliation with a large number of the smaller societies, might reasonably have been expected to devote itself to propagandist and organisation work, such as would promote this application of photography in numerous local centres. Obviously undertakings such as these, in the case of a society with the professed aim of the advancement of photography, require to take precedence over the provision of dark-room or studio facilities for those of its members who can avail themselves of them.

Nevertheless, in criticising the R.P.S. it is no more than fair to bear in mind that the last ten or fifteen years have from the nature of things been a more difficult period for it than that which covered the presidencies of Sir William Abney, Sir Henry Trueman Wood, and the late Lord Crawford—a period which now and again is held up to our notice as the exemplar of what should now be accomplished. But during that period (from 1892 to 1900) there was more doing in photography. It was a period of activity in several directions. For example, in photographic optics, in the introduction of new developers, and in the development of photo-mechanical methods of reproduction. In such circumstances it is a much easier matter for a society to lead an active life than it is when conditions generally are more stagnant and interest requires to be stimulated. The address, we think, scarcely made sufficient allowance for this difference of circumstances in its criticism of the Society's activity, or want of activity, during the past few years. Moreover, much of its criticism is non-constructive in that it expresses regret that work being done by other bodies in the fields of professional photography, photo-micrography, radiography, and the holding of trade exhibitions is not being done by the Royal. It is constructive chiefly in the sense of suggesting friendly alliance with these bodies, although the character of such alliance is not defined and is not easily imaginable. Still, the address may do a good deal of good if it prompts individual members of the Royal to press upon the Council suggestions of steps which might be taken in the interest of the whole photographic community.

One or two matters occur to ourselves, and may, therefore, be appropriately put on record at this period of review of the past and resolution for the future. The Royal, we think, might greatly intensify the value of the technical papers which are read before it by taking steps to circulate proofs some days in advance of the reading of the paper. As things are now, it is the almost invariable rule, when discussion is invited, that opinions are expressed by those present to the effect that the paper requires a study at some leisure before it can be adequately discussed. Thus it comes about that there is no discussion, whereas if the opportunity were given for a previous perusal of a communication by those members interested in it discussion would be possible and profitable, and at the same time the opportunity would be afforded of inviting to the meetings those who are not members of the society, but would in many cases welcome the opportunity of contributing their views. Moreover, the rule of having a paper set up in type before delivery would be a preventive of a thoroughly unworthy communication being offered to the Society. At present there is no such safeguard. We have been told in the past that the society has negatived this suggestion on the ground that, if proofs were circulated in advance, editors of journals would print it in full before it appeared in the Society's "Journal." We are confident that that fear is wholly imaginary.

Another suggestion is that the Society might utilise more fully the facilities which it possesses for demonstrations of photographic processes. Along this line it can undertake services which cannot be discharged by any other means. There is no equivalent which a photographic journal, for example, can offer for actually seeing a thing done before one's eyes. In that connection the policy should be not to look askance at any demonstration which may happen to be available from a commercial firm. Usually the manufacturer has facilities for demonstration which are beyond those of the private individual. There is no reason why the society should not welcome such "trade demonstrations" with the qualification that it should be the first photographic body to present the demonstration, and that it exercise a sufficient and proper control over the function, satisfying itself beforehand that the subject will be adequately dealt with.

THE FIXATION OF PRINTS.

[In the current issue of "American Photography" Mr. A. W. Warwick describes the results of submitting the process of fixing paper prints to an examination similar to that accorded to plates and film, and described in the "B.J." of December 7, 1917. The scientific interest of his results cannot be questioned, but at the same time it requires to be very clearly emphasised that the conditions of his experiments are very far removed from those of actual practice in fixing prints. His paper, as we point out in some notes on another page, requires to be read with a recognition of this difference.—Eds. "B.J."]

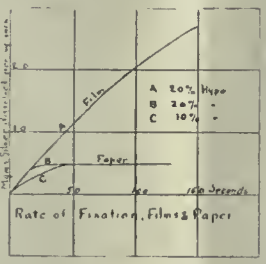
In the fixation of a print the photographer has no visual criterion to guide him as to the progress of the operation, as he has in the case of a negative. Absolute dependence must be placed on the adequacy of the time of immersion in a hypo bath of given strength and temperature. Printing paper differs in no essential chemical respect from a photographic plate or film; both should follow, therefore, the same general law of fixation. However, when the law which is obtained from the study of negatives is applied directly to the fixation of prints, it gives such extraordinarily short periods of time for complete fixation that the results are at first unbelievable. It is only by thorough experimentation with different strengths of solution and different papers that conviction comes as to the shortness of time required to dissolve all unaltered silver bromide in a print. Even in a comparatively weak hypo solution it is a matter of seconds completely to transform the silver into a soluble form, rather than of minutes.

From the data already published on the rate of fixation of negatives, it is possible to calculate the time required to fix a piece of printing paper provided that certain additional data on the latter are at hand. It is possible to test the accuracy of these calculations by simple experimental means, although, of course, it is advisable to check the results by rigorous methods. Let us see, first, however, what conclusions we can come to from the data obtained from plates and films.

It is first necessary to know how much silver in the form of bromide we have to deal with in the case of paper. A certain popular and excellent developing-out paper was carefully assayed for its silver contents and gave a result of 0.35 to 0.45 milligrams of silver per square inch. That is, a 3¼ by 5½ inch sheet will contain from 6¼ to 8 milligrams of silver, or from 0.09 to 0.12 grains. This is about one-tenth or one-twelfth the silver content of an ordinary grade of plate or film.

The data obtained from the study of plates may be plotted in the form of a curve on squared paper. The ordinates, or vertical lines, give the amount of silver dissolved per square inch, while the horizontal lines, or abscissae, give the time elapsed. Curve A gives the rate of solution when a 20 per cent. hypo solution is used. The results can be tabulated also by using the arithmetical formula governing the rate of solution already given, taking the amount dissolved in one minute, or any other unit of time, as a basis of calculation. The table so calculated may be compared with the results of the plotting by curves; both are shown in the next column. From either the curve or the table it is obvious that a film of silver bromide containing only 0.35 to 0.45 milligrams of silver per square inch should be dissolved by a 20 per cent. hypo solution in from 15 to 20 seconds. This seems absurd in view of the instructions which accompany the paper to fix it in a 20 per cent. bath for from 15 to 20 minutes.

A simple test, which while illuminating is not quite convincing, may be applied as follows: Cut a piece of D.O.P. (gaslight paper) into halves. Immerse one of these for 20 seconds in a 20 per cent. hypo solution. Thoroughly wash in plain water, giving, say, six changes. Immerse both pieces of paper in a 5 per cent. solution of sodium or any other alkaline sulphide. The untreated portion of the paper will turn a deep sepia tint owing to the presence of silver bromide, while the piece of paper which has been fixed for 15 or 20 seconds only will remain perfectly white. An interesting modification of this test is to test the hypo-treated paper as it comes out of the bath by touching the moist surface with a glass rod which has been dipped into the sulphide solution. A deep brown spot will at once appear. Wash the paper in a tray with water and at each successive change touch a fresh place on the paper with the glass rod moistened with sulphide. It is interesting to note how much fainter the brown spot, thus formed, becomes with each successive wash, until at last after, say, six changes of water, no spot whatever is developed. Thus we see that any silver contained by the paper, when removed from the hypo bath, was in a soluble form, and we see the necessary number of water washes to remove it.



SOLUTION OF SILVER BROMIDE IN PLATES BY 20 PER CENT HYPO.

Time Seconds	Silver Dissolved Milligrams per Square Inch
5	0.13
10	0.2
	0.38
20	0.50
30	0.73
	1.34
	2.09

Compare this table with Curve A at the left.

It may be validly objected that this test is only conclusive as far as the high-lights of a print are concerned; it throws no light upon whether all the unaltered silver bromide has been removed from the image or not.

A good vigorous print on the same make of paper (D.O.P.) as used in the foregoing experiment was fixed in two successive quantities of 10 per cent. hypo for 45 seconds at each immersion. The print was then washed in six changes of plain water, followed by a ten-minute immersion in 10 per cent. hypo solution. Each quantity of solution, or water, was tested according to the colorimetric method; the results are listed below.

First hypo wash	93.0 per cent. extracted.
Second hypo wash	6.5 per cent. extracted.
First water wash	0.5 per cent. extracted.
Second water wash	trace extracted.
Third hypo wash	faint trace extracted.

Thus we see that after 1½ minutes' fixation all the unaltered silver bromide was extracted or converted into the soluble silver salt. It is not unlikely that a portion of the silver shown to be extracted in the second hypo wash was carried over from the first bath by the paper itself. Tests on plates with a 10 per cent. hypo. solution indicated a complete extraction of silver bromide from printing paper in 45 seconds. The effect of the image is, therefore, very slight, being only to cause a comparatively slight slowing up of the reaction. There is no absorption either by image or paper.

The more rigorous methods of assay simply confirm these results. Tests were made on unexposed paper and prints. The amounts of silver dissolved in each period of time were determined by assay and the beads weighed, except in the last stages, where they were too minute to weigh. In these latter cases they were measured by micrometer and the weight calculated on the basis of a perfect sphere. The strength of hypo used was 10 per cent. in each case. The following tables give typical results:—

Rate of Solution of Silver Bromide from D.O.P.

Minutes.	Milligrams dissolved per square inch.
0—1	0.449
1—2	0.465
2—4	0.466
4—6	nil
Paper assayed	nil

Rate of Solution of Silver Bromide from a Print.

Minutes.	Silver dissolved per square inch.
0—1	0.325
1—2	0.363
2—4	0.364
4—6	nil

In both cases extraction was complete in practically two minutes. The extremely small quantity of one-thousandth of a milligram of silver dissolved out in the third unit of time could have no effect on the keeping quality of a print.

It would seem proved from these tests that plates and papers follow the same general law of fixation. Such small variations as may occur are due merely to the slightly different physical characteristics of the emulsions and to the fact that in paper both sides of the film of emulsion are attacked by the hypo. Papers, indeed, should fix a little faster than plates, owing to the porous nature of the support allowing the hypo to enter at the back of the film and the soluble silver salt to come out by exosmosis.

It would seem clear, moreover, that the instructions to fix for twenty minutes err through an excessive fear of incomplete fixation. The statement frequently made that more prints are spoiled through insufficient fixation than from insufficient washing requires qualification. The reverse of this statement is more probably true.

The actual time of fixation absolutely to ensure the removal of bromides or chlorides of silver from a print depends upon the richness of the emulsion, the strength of hypo, and the temperature. With a fresh 10 per cent. hypo bath at 65° F., the ordinary run of D.O.P., such as Velox, Cyko, etc., need not be fixed for more than five minutes, and ten minutes may be taken as an extreme length of time. In the use of other special papers a few tests will indicate whether or not they fix faster or slower than ordinary papers.

A. W. Warwick.

THE ROYAL PHOTOGRAPHIC SOCIETY.

The annual address delivered by the President, in November last and now just published. We give it the title printed above, since its subject matter is chiefly a discussion of the directions in which the Society should work for its professed object of the advancement of photography.—Eds. "B.J."

A year ago yesterday, when I had the privilege to address you from this platform, that day closed upon the 118th week of the war. I remarked that it was not in the power of man to say whether or not we should be still engaged in the struggle for life or death on the occasion of the next address from this chair. To-day we find ourselves in the sixteenth week of the fourth year of Armageddon, the termination of which we cannot yet discern, but the great events amongst which we are living now appear to be coming more rapidly to a climax; it is, therefore, important for everyone and for every institution also to look ahead, and see that when the opportunities of a new state of things arise we are in a position to seize them. There is one view of the future upon which everybody whom I meet seems to be agreed, and that is, that it will be very different in many ways from the past. How it will differ there are many opinions, but that it will differ there is only one. In thinking over the topic of my annual address I have had to decide between the claims of the past and the future, and to make up my mind whether I should deal with the work of the society, which, as you will, I am sure, admit, has been carried on under circumstances of the greatest difficulty during the last twelve months, or whether I should look ahead and see in what direction we ought to take thought to fit ourselves for what lies before us; and it seemed to me that the latter would be more in keeping with the tendency of the time, and of more service to the institution of which you have done me the honour to elect me president.

In considering the course which the Royal Photographic Society should take, we must consider the purpose for which it was founded. Over sixty years ago a number of distinguished men, deeply interested in the then youthful subject of photography, founded this society. In these early days it was called "The Photographic Society of London," but I have not been able to find that it ever officially took that title. The resolution passed at its first meeting was "That a society be now established to be called 'The Photographic Society.'" About twenty years after this, at a time when there was much unrest in the society, it changed its name to "The Photographic Society of Great Britain," and under that title it was known until her late Majesty Queen Victoria graciously ordered it to be called "The Royal Photographic Society of Great Britain." I know there are people who say, "What's in a name?" but in this case I think there is a good deal. The society has a name which marks it out from all the other photographic societies and camera clubs in the kingdom; and I am sure you will agree with me when I say that that name imposes upon us duties and responsibilities which are also very different from those which are borne by the members of those other societies. It will be time usefully employed if we see of what those duties and responsibilities consist.

It is a curious thing that the original founders of this society did not think it necessary to incorporate in its constitution any expression of the purpose it was intended to serve. There is no statement of the "objects" of the society in the rules which were passed at the inaugural meeting, but in the discussion which took place those objects were plainly indicated. Sir Charles Eastlake, who was then president of the Royal Academy, and our first president, took the chair, and in his opening remarks spoke of the "idea of a society having for its objects the cultivation and promotion of this process (photography) and of its various applications"; and other speakers referred to the society as "insuring the future progress of photography," the "full development of the photographic art," and in similar phraseology. At the next meeting of the society, the first regular one, if we exclude the inaugural meeting, its honorary secretary, Mr. Roger Fenton, read a paper "Upon the Mode in which it is Advisable that the Society should Conduct its Labours"; and in that paper he gave a summary of what, in his opinion, the society could and could not do. The principal objects of the society, he said, are "the collection and the diffusion of information, the verification and explanation of new discoveries, the comparison of processes and of their results, and the improvement of the mechanical and optical machinery of the art." The wording sounds quaint and old-fashioned to-day, but there is no doubt what was in Mr. Fenton's mind; and the members of the young society did not question that their chief executive officer had taken a correct view of its functions. At a later stage in the society's history it was thought well to embody in its rules a definite statement of its purposes; and the object of the society was defined as "the advancement of photography." That statement remains in force to-day. It defines or limits what we have *the power* to do; but it also expresses what we *ought* to do. There may be other societies or camera clubs to which many of us belong which either explicitly state or tacitly assume that their objects are the mutual assistance of their members—very excellent objects everyone will admit—but still fundamentally different from our own.

I have made this brief digression into the history of the society because I think it well that we should all be reminded of the purpose for which it was instituted and which it has officially recognised as its own. I suppose there is no one here who has ever attempted to bring in new members, which are so necessary if the society is to be kept active and flourishing, who has not been met by the question, "What will the society do for me?" and we must all have replied by pointing out the advantages of membership. But in doing so I wonder how often we have put in the foreground of those advantages "The privilege of subscribing one guinea a year for the *advancement of photography*." And yet if the constitution of the society is to be accepted literally, that is essentially the "*advantage*" of membership; and if the member gets any personal facilities or pleasure from joining, they should be merely incidental, something in the nature of a by-product.

Whether in the actual management of the society we have diverged at times from this high ideal I will not discuss. We who have had to bear the burden of the society's conduct and management can at least never complain that the tonic of criticism has been withheld from us. I am not prepared to deny that there have been times when a little fuller recognition of the conditions under which we have laboured, and of the difficulties of the case, would have been more helpful. But criticism, so long as it is fair and unbiassed, is not only valuable, it is absolutely necessary. We have only to look at the political problems of the day to realise that, and to see that the compulsory suppression of criticism is very actively harmful. So I do not complain of honest criticism, while we may ignore any of the other kind. We will not consider how far there has been any basis in the past for the charges brought against the society, but rather will look to the future and see how best we may carry out the work which it was founded to do, which I think we are all as fully agreed on to-day as our predecessors were in 1853, and that it should be our object to achieve.

At the first glance the "advancement of photography" seems rather a vague phrase. What is the photography which we are to advance? Is it the scientific side of the processes which we use and the instruments which are at our command? Is it the practice of photography as a profession? its pursuit as an amateur's hobby, its use as a recording agent, or its application as a means of pictorial expression? Some of these aspects were hardly visible to the founders of the society; but I think, as far as they were, they would have recognised all of them as falling well within the sphere of our activities. Every one of these branches it is our professed duty as the Royal Photographic Society of Great Britain to strive to advance. Some of them, the least favourable critic must admit, owe much to the society; others we have not done so much for; and if we feel this, it is well to search out the cause and, if we can, to remedy it.

I think one ever-present influence which has restrained the activities of the society in the past has been the fact that we have rather taken the view that we should not act until called upon to do so. We may not always have been as busy in finding out the requirements of the photography we are constituted to advance as we have been in doing the work when it came to hand. In consequence we may have allowed opportunities to slip by. We may resolve in the future to formulate a more enterprising policy, and to seek the occasions in which we can be of use, instead of waiting until they come to us. This is a direction in which the members at large can do their part. One can understand that the acting officers of the society, employed as they are in carrying on its work from day to day, cannot waste much time in looking for fresh schemes which can only increase their labours and their responsibility. The regular meetings and the exhibition are important as methods of attaining our objects, but they ought not to be the beginning and the end. Later on I hope to suggest other directions in which the society might look for a useful outcome from its work.

Another matter on which I should like to lay stress is the light in which proposed new ventures may be regarded. It is natural enough to ask, "In what way will this benefit the members?" I have heard such a question put many times and in such a way that it was plain that the questioner considered that if it could not be pointed out that the individual members got some visible benefit the proposal was a bad one. What has gone before shows that this is not a correct view, if our constitution means what it says. There is no word in it, not even a hint, to suggest that the society exists to confer any benefits at all on its own members that it does not confer on everyone else who may be interested in the advancement of photography.

For example: we have a very large and varied photographic library, the best in London certainly; possibly the best in the world. If a non-member wished to consult it for a proper purpose I would throw it open to him as freely as I would to a member who had subscribed to the society for fifty years. The library should be looked upon as one of the means by which we advance photography. Organising it and making it as complete and its contents as widely accessible as is humanly possible appears to me to be one of the clearest paths towards our object.

You know how my heart is in the society's exhibition. There again we have a direction in which we can do valuable work. This year, for special reasons, the exhibition is free to all, members and non-members alike. It may not always be possible to adopt this policy; but at least it seems to point in the direction in which we ought to go. I am not entirely prepared to measure the success of the exhibition by its balance-sheet, as if it were a commercial concern; and if we had to choose between giving special privileges to members and getting together the finest collection of pictures possible, the privileges of members ought not to come first. Nor do I think for a moment that the society would suffer in any way by such an action. Financially it would not; as when it comes to asking for monetary help, I have found that the better the case the more ready are our members to give their support. Exhibitions play a most important part in advancing photography, and no plans for the future development of the society will be complete that do not consider means for making the pictorial exhibition much stronger. We must see to it that the facilities and inducements we offer—not necessarily in the way of awards, but in effective display, in the confidence of strictly impartial management, in selection by those who possess most fully the confidence of the leading exhibitors, and in similar directions—are such as will bring us the very cream of the work each year.

Then there is the organisation of a proper trade exhibition, either annually or at such times as will be found most suitable. We are only just beginning to learn the importance of doing our utmost to foster and support British industries, and the photographic trade is one in which this country has played a very great part. It will be seen that I put the very widest construction upon the terms "photography" in our articles of association: much wider than there has been an inclination to give it in the past. But it is not limited there, and I do not see why we should regard it as limited. "Photography" includes photographic industry, as well as photographic science and photographic art. It should be recognised, therefore, as well within the objects of the society to see that the part this country has played in photographic trade is maintained and extended in the future. This brings me to a subject which ought to be considered much more carefully than it has been. We are the "Royal Photographic Society of Great Britain." We are national by name and constitution, and in the future that aspect must become more marked with us as with everybody else. It is not fitting, it is not wise, that we should have in our ranks at any time members of enemy origin, and I am not sure that we ought even to limit this to those who are "legally" our enemies. The country has suffered too much from such legal fictions in the past, and I hope is learning or has learnt its lesson. The mere naturalisation of an enemy *may* make him a British subject in the eyes of the law, but in the eyes of a man of ordinary common sense it *may* only make him a more dangerous enemy, because a disguised one. The naturalisation doctrine seems to me somewhat like forbidding the sale of a poison labelled "Poison," but encouraging its sale in the guise of sweets. The constitution of the society should be such that no enemy of our own country should be eligible as a member at any time, and most decidedly should not be permitted to hold the highest honours which the society can bestow. This is a reform which would be better carried out *now* than when the war is over. It would at least be a clearing of the decks for action.

In carrying out the work of the society in the future I would put in a plea, not for extravagance at any time, but for a financial policy which is judiciously enterprising. The subscriptions of our members are paid to be expended on the objects of the society, and neither to be spent in "facilities" for members nor hoarded against some mythical rainy day. Beyond a reserve fund large enough to prevent a bad year or two from interfering with the general conduct of the society, I doubt if we are justified in saving money at all. However, the present time is not one when there is any need to justify saving, so I need not dwell on that side of it. Before leaving this subject I may reply to a possible criticism that such a policy as I have sketched out would affect either the membership or the funds of the society adversely. I cannot believe it. If we rely upon direct personal benefits conferred, our membership *must* be limited to the photographers who are in a position to take advantage of them, not a very large number even in London. On the other hand, it is hardly likely that there are not more than fifteen hundred people able and willing to subscribe a guinea a year to a society which they see is doing good work for photography as a whole. I am a firm believer that, provided we choose our ground carefully, and occupy it well, the more we do the more we shall be enabled to do.

Opportunities for useful work are continually cropping up. A very conspicuous case is before the public at the present moment. It has been rightly proposed that the nation should form a collection of portraits of those who have played an important part in the Great War, and the portraits are to be photographic ones. In addressing an audience of photographers I need not point out the importance of undertaking such a task with the benefit of skilled and disinterested advice. Yet the body which is forming the collection does not appear to have recognised the necessity at all.

If the Government has to buy cloth, or hay, or chemicals, it has now learnt the lesson that it must have the services of cloth experts, or agriculturists, or chemists; but when a Department of the Government has to get photographs it has been content to put itself in the hands of one commercial firm, and in its so-called "special collection" has limited admission to the work of that firm. This was a case in which the society should have been consulted from the very beginning. At least it might have prevented a gross blunder. But I think it could have done much more. It is a unique opportunity and one that should have been fully utilised. The great photographic portraitists are individual manufacturers, and the work in such a national collection should be the finest of its kind, worthy alike of the subjects and of the occasion. Whatever may be said for the course which the National Portrait Gallery has adopted, and at the best it cannot be much that is favourable, it is evident that this special collection cannot rise much above the level of the average home portrait album. The excuse that the step has been taken to secure some kind of uniformity (uniformity in *what* is not stated, nor is it easy to guess) is one which is quite unworthy of the National Portrait Gallery. It is not pretended that the collection will be the work of some one leading photographer of high standing in his profession, for which some kind of case might have been made out, and any other uniformity can only become a monotony. It may not even now be too late to prevent so great an opportunity from being lost, and if it appears to be in any way possible, I would suggest that we make every endeavour to save the national collection for the benefit of those who are to come after us, from being, what on the present lines it must become, a mere wasted effort.

That such a scheme should have been put into operation without any question on the part of the public shows how the public regards photographic portraiture. It still looks upon it as a purely mechanical product, to be bought at the nearest shop, like a packet of soap or a yard of calico. It sees no difference between a portrait by Furley Lewis or Histed, let us say, and one by the new Electric Photo Art Co. (let me add that the firm I have just named is a conception of my own, merely used as a type. I hope I have not been unintentionally quoting the title of any existing company.) To remove that general but mistaken impression, it is our duty as a society, so far as lies in our power. It would "advance photography" to show the public, or at least the educated public, that there are portrait photographers and portrait photographers; that there may be qualities in a portrait much deeper and more vital than mere gloss or retouched smoothness; that the better work will live and seem modern and masterly, just as D. O. Hill's work has lived; while the other in years to come, if it exists at all, which is very problematical, will merely cause a smile. It may take a long while to bring about such a change, but it is at least an object well worth pursuing, and which in some ways could be undertaken from the very first.

It seems to me that if such a national collection worthy of the name is to be formed, there are two quite distinct sides to its formation. One of these is the formation of the list of those whose portraits should be included. This is not the work for which the Royal Photographic Society is better fitted than any other body. It calls for a wider knowledge of individuals and the part which they have played than we can lay claim to. Whether the Trustees of the National Portrait Gallery have that knowledge it is not for me to say. It is fair to assume that they have been selected because of their knowledge of painted portraits, such as hitherto the Gallery has dealt with, but it may be that in appointing them their knowledge of the subjects of paintings and drawings was taken into consideration, and if so they would be a very proper body to be entrusted with deciding whose portraits should be secured for the collection. But when such a list is prepared, then there is no other body that I know of so well qualified as the Royal Photographic Society to see that the national collection shall include the best photographic portraits that can be secured, of those whose names are on the list. Something more than "the usual thing" should be got whenever it is at all possible. The work should be divided amongst those whom the photographic world recognises as the leaders in portraiture, or should have some distinctive merit. It is an occasion not only for forming a very valuable collection, but for making one which should show the high position which photographic portraiture has attained. The need for such evidence is plain enough. The action of the Trustees of the National Portrait Gallery, who might be expected from their position to know something of portrait photography, does not appear to have so much as a suspicion of its position.

It will be seen that whatever view I may take of the society and of its activities, it is not one which is likely to find it short of occupation. Yet I have only named a few of the directions in which it can do valuable service. The last few years have seen the formation of photographic bodies outside it, covering ground which it might be thought the Royal Photographic Society should have covered. We have the Photomicrographic Society, the Professional Photographers' Association, the British Manufacturers' Association, the Röntgen Society, to name only a few. It is possible that with full activity on our part some at least of these separate organisations would not have been needed. But they have been formed, and we have to deal with facts. At least we can see to it that with all such bodies we are working in harmony, that when they need it they can count upon something more than the sympathy of the Royal Photographic Society, and that when, in the future, the idea of fresh societies to deal with speciel sides of photography or offshoots from it are thought of, as is bound to happen, the first idea of their promoters shall be to see how far it is possible to do what is wanted and still keep within the circle of the society itself.

It is largely a matter of seeing that the management of the society is not without imagination, and is able to exercise some little anticipation of what the future has in store. If we are able to do this we may hope to see the Royal Photographic Society extend in influence and in usefulness far beyond its present limits. Personally, I am quite confident that the possibilities of membership in the future are much greater than our present membership roll, after making all allowances for the war, would indicate; and while it is a mistake to suppose that the number of members is a reliable indication of the value of the society in its own sphere, at least a large membership implies large resources with which to carry on the work.

In pointing out what may be done in future, I have not intended to make any reflections on the past. As you know, I have been one of the council of the society for many years, and have had my share in its administration. We have had limitations of many kinds, and have done what we could with them. Some of these limitations have been imposed by circumstances, and some, I believe, have been due to misconceptions which time will remove. I do not expect the society will do everything which I think it should do, and I hope it will do much that I have not mentioned and that has not occurred to me. But the present time seems so appropriate for a consideration of the lines which we ought to follow in the future, and so appropriate also for an attempt to widen those lines, and not to rely on precedent to such an extent as to hamper our usefulness, that I thought it best to indicate some of the directions in which it might be done. The times are changing, and we must change with them.

There is one more topic which I wish to put before you to-night. We have been looking into the future, let us come back for a moment to the present. Last year I was able to show you some of the achievements of the photographic branch of our Military Service, and to convey some idea of the wonderful part which photography in its hands is playing in the war. I was unable then to deal with the naval side of the same subject, for reasons which I need not give at the moment; but now, thanks to the kind permission of Commodore Paine, Director of the Air Services, I can partially make good the omission. Time will not admit of anything more than a brief résumé of what our naval airmen are doing, and for obvious military reasons much of their wonderful work must remain a sealed book, so far as the public are concerned. I fear that even after the war half can never be told of their marvellous efforts. In a military sense photography was almost an unknown quantity with us when hostilities commenced, and its value for some time went unrecognised. But there has now been built up in the two Services a gigantic photographic organisation, which has a most potent influence on the war, and not until its history can be fully written will the true position and value of military photography be understood and appreciated. When that time comes I hope that we shall not find that our society has been in any way diffident in bestowing the highest honours upon those who have accomplished so much in aerial photography.

The Headquarters of the Royal Naval Air Service are not very many miles from London, and at these the recruiting for the Service is carried on, and the men receive their technical training. The designing and perfecting of the apparatus required is also done in a branch of the same establishment. Since 1914, not only has the apparatus been vastly developed, but the work done with it has been correspondingly extended. When the R.N.A.S. photographic service was formed, the greatest height at which serviceable photography was considered possible was about 3,000 feet. During 1915 this was increased to 6,000 feet, which in 1916 was carried up to 15,000 feet, while to-day most valuable results are obtained from 20,000 feet. Nor is there any reason to suppose that the limit has been reached, or that when some means have been devised to sustain life in still more highly rarified atmospheres this record will not be beaten. Fundamentally the cameras used by the naval and military services are similar, but there are differences in detail. The military use an apparatus constructed chiefly of wood, and operated generally from outside the machine, while the R.N.A.S. cameras are constructed almost entirely of metal, and are worked from inside the fuselage. The shutter is one of a strong, reliable, focal-plane type. The equivalent focal length of the lenses varies from about 10 to 40 inches, and the plates from 5 x 4 to whole-plate size.

About two dozen plates is the number generally used upon a photographic reconnaissance, though occasionally more are required. These are not promiscuously exposed, but each has its definite object. The plates are developed, fixed, washed, rapidly dried, and a hundred prints by contact are made and delivered to headquarters in something less than three hours from the time when the machine comes to earth. Often the machines returning from these photographic expeditions have suffered badly from shrapnel and machine-gun fire.

To take a few typical cases out of very many. I can tell you of one pilot who was flying at a height of many thousand feet well over the enemy's lines when a shot put his engine completely out of action; nevertheless, he planed back and delivered his exposed plates safely at the aerodrome. Another, 14,000 feet up, was attacked by a hostile machine, and his engine was also totally disabled. In spite of this he drove his adversary down into the sea and he himself planed back fourteen miles to the starting point with his photographs. Another pilot, shot right through from front to back at the shoulder, while a long way from his base, was able to fetch his mark and make a good landing with his exposures. In the course of a reconnaissance to obtain a series of photographs, another machine was hit in thirty-four places, and yet came back with the work. I could go on giving these examples almost *ad infinitum*.

Probably you are wondering as to the photographic quality of the results obtained in such trying conditions. Believe me, that quite apart from the supreme importance that they possess from a military point of view, those I have seen have been technically first-rate, with such splendid definition enabling the ordnance maps to be corrected and brought up to date in every detail, and ground of which no maps exist has been plotted out and efficiently laid down with a minuteness of record of the greatest importance to the Services. The operators who do this work are not merely photographers. Their duties necessitate that they shall also be keen observers, wireless operators, and expert machine-gunners. As far as observation goes, imagine what a fort or battery must look like from a height of 15,000 feet, the battery having been concealed by every device that skill can produce, with the direct intention of making it unobservable from the aeroplane. At that height it is little more than a spot upon the plate, but the photographers succeed over and over again in getting that spot well centred on the plate, and do this while travelling perhaps at the rate of 120 miles an hour, and amid all the distracting attention of hostile aircraft. In spite of all, plane after plane comes in with the desired detail correctly centred upon the plates.

Photography is also largely used to provide definite evidence that the *motif* has been accomplished both on sea and land.

In concluding, I wish to take this opportunity to remind you that chivalry is not missing amongst the British airmen. On one occasion after a photographic reconnaissance in Flanders one of our airmen was flying at an altitude of 20,000 feet, and at that great height an anti-aircraft gunner was successful in scoring four direct hits in succession; however, the pilot managed to bring his machine back to his aerodrome, and as he stepped from his machine he doffed his cap in recognition of the skill of the gunner.

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SECOND-LIEUTENANT ERNEST BROOKS, one of the official photographers with the British Expeditionary Forces, has been awarded the Croix de Guerre Mr. Brooks has had a notable career as a photographer, and was formerly a member of the *Daily Graphic* staff. He has spent nearly two years on the Western front, and previously recorded the Dardanelles operations in a series of remarkable official photographs which were published throughout the world.

DEATH OF MR. GEORGE C. WHITFIELD.

We regret to announce the death, on December 31 last at Eastbourne, of Mr. George C. Whitfield, at the advanced age of 86.

In the death of Mr. Whitfield there passes away one who was associated with the early days of the dry-plate industry. When in the year 1880 the prize of £50, offered by Sir Joseph Paget for the best photographic emulsion, was awarded to the late Mr. W. J. Wilson, the latter, looking around for financial support, obtained it from Mr. Whitfield, by whom the Paget Prize Plate Company was established in the year 1881. Mr. Whitfield, who was educated for the medical profession, retained throughout the whole of his life a keen interest in photography, but for the past fifteen years he had taken no active part in the business of the Paget Company. He joined the (now) Royal Photographic Society in 1855 and at the time of his death was thus the member whose name has stood for the longest period upon the roll of that body.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, JANUARY 14.

Dewsbury Photographic Society. Y.P.U. Print Portfolio.

City of London and Cripplegate Photographic Society. Members' Print Competition.

Bradford Photographic Society. "Photography and Focus" Slides.

TUESDAY, JANUARY 15.

Royal Photographic Society. "Shakespeare and the Stage." Cumberland Clark.

Birmingham Photographic Society. "Warwick." Harold Baker.

Hanley Photographic Society, Y.M.C.A. Midland Photographic Federation Portfolio.

Sheffield Photographic Society. "The Music of the Bible." T. W. Hanforth, Mus.Bac.

Keighley and District Photographic Association. Criticism of Lantern Slides and Prints.

Stalybridge Photographic and Scientific Society. "Pictorial Work in Great Cities." A. H. Blake, M.A.

Monklands Photographic Society. "Gas-Light Printing on Noctona." The President.

WEDNESDAY, JANUARY 16.

Croydon Camera Club. "Impressionism and Post Impressionism." J. Vacy Lyle.

Bristol Photographic Club. "Studies in Natural History," illustrated by Colour Photography J. Cooper.

Ilford Photographic Society. "A Chat on Pictorial Photography." S. Bridgen.

THURSDAY, JANUARY 17.

Hull Photographic Society. "Trees and their Literary Associations." W. Buston.

Liverpool Amateur Photographic Association. Annual meeting.

Hammersmith (Hampshire House) Photographic Society. "One Man Show." J. B. B. Wellington, F.R.P.S.

ROYAL PHOTOGRAPHIC SOCIETY.

MEETING held January 8, the President Mr. John H. Gear in the chair.

Mr. H. Essenhigh Corke delivered a lecture on bromide printing in the course of which he dwelt upon a number of prints drawn from his experience in this method. Bromide was, he said, at once the easiest and most difficult printing process. He took that view for the reason that effects which one worker could get on a given paper seemed to be altogether beyond the power of another experienced user of the same material. He dealt with difficulties in sepia toning and with the differences exhibited by various papers in this respect.

In the discussion that followed Mr. McIntosh referred to the easy removal of tarnish from old uranium-toned prints by means of a hard rubber and suggested that the same means might remedy the markings found on the edges of black bromides, as mentioned by another member.

A hearty vote of thanks was accorded to Mr. Corke for his paper.

CROYDON CAMERA CLUB.

MATTERS about Christmas time take the form of "conversational evenings," the Wednesday before Christmas being attended by four conversationalists; that after, by two. The first evening was foggy, and the Rev. Le Warne established a record in railway travelling on his way home, taking exactly two hours five minutes from East Croydon Station to Norwood Junction, a distance under two miles. It is distressing to think that his profession forbade warming language on a bitterly cold night. The L. B. and S. C. Railway, like an overcooked emulsion, is particularly susceptible to fog, and a story is told of a passenger on a platform who once blew a cloud of tobacco smoke across the track, and disorganised the traffic for hours.

Last week Mr. E. A. Salt was down for a paper entitled "Bromoil v. Nature," but at the last moment abandoned it, to the pained surprise of the bromoil enthusiast, Mr. G. B. Clifton, who had journeyed down from Ealing to help in laying out the corpse. Still, the paper is only postponed, and Mr. Clifton earnestly requested an invitation to the funeral directly the date is fixed. He did not express it in this way, but all understood what was meant. Precisely, but the pertinent question arises—whose funeral? In explanation, Mr. Salt said it seemed hardly decent to start bombing the pictorialists so close to the festive season, and he therefore proposed to substitute "cosway" border printing. He showed how quickly and easily the borders could be printed round portraits, and also the method of obtaining registration on the film to prevent the junction showing, simple in actual practice, but far from easy to describe without diagrams. A combination print on "Noctona" gaslight paper was made, and the demonstrator spoke highly of the paper, which he regarded as an excellent brand of its class. Much to his gratification he had hit the correct exposures on his first attempts, and had boastfully so written to Mr. Green, of Messrs. Griffin, who replied that he had been deceived by the enormous latitude of the paper, which he (the speaker) considered to be an unkind and uncalled-for observation. Prints from Cosway border films supplied by the Autotype Co. received approbation, but other designs shown, by general consent, were deemed to be of such a character as to outrage the artistic instincts of a cockroach. Perhaps this was putting things a little strongly, but certainly the expression of the president, Mr. John Keane, as he gazed on the prints, seemed to indicate a possibility of synthetically manufacturing the now scarce acetic acid by a purely mental process.

The rest of the evening was filled by Mr. F. C. Wratten, a veteran in photography, but youthful in his energy and activity. Unfortunately, his son, Mr. S. H. Wratten, has removed to the other side of London, and the club seldom sees him. Had he been present he would have enjoyed, as all did, a capital tabloid lantern-lecture on the game of "bowls," depicting its subtleties, and the attitudes of the players recorded by focal-plane exposures. The exposures were undoubtedly short, but in most cases appeared to be fully timed, never seriously under-exposed. A series of P.O.P. prints passed round also demonstrated the negatives to be of first-rate quality.

RÖNTGEN SOCIETY.

AT the meeting held on January 1, 1918, Mr. Carl Darnell read two papers communicated by Dr. Coolidge, of the General Electric Co.'s Research Laboratories, U.S.A.

The first dealt with a new form of Coolidge tube, in which the anticathode consists of a block of copper faced with a small button of tungsten. This is fixed to a thick stem of copper which passes out through the glass neck of the tube, and terminates in a fine radiator. The anticathode is thus kept cool, and does not in consequence emit electrons as in the case of the earlier Coolidge tube in which the whole of the anticathode speedily becomes red hot. The new tube, therefore, so completely rectifies current that when an alternating potential is applied only one phase of the current will pass

In the second paper, by Dr. Coolidge and Mr. Moore, the portable or field X-ray outfit of the United States Army was described. A petrol electric unit supplies alternating current at 110 volts to a transformer arranged to give both high tension and heating currents for the new radiator type of Coolidge tube. For simplicity of control the tube is worked at a constant potential of 5 in. equivalent spark-gap, and the current is adjusted to five milliamperes for continuous running of the tube or ten milliamperes for short periods. An electrically actuated control on the throttle of the engine maintains constant output. The small size of the tube, 3½ in. in diameter, enables a close-fitting lead-glass shield to be employed; this is made in two parts, and completely surrounds the tube, a suitable aperture permitting egress of the rays.

Commercial & Legal Intelligence.

Rotary Photographic Co. (1917).—December 18. £25,000 (£1). To enter into an agreement with Wiggins, Tape, and Co., Ltd., to acquire any assets of the Rotary Photographic Co., Ltd. Private. Cobham Mill Road, W. Drayton, Middlesex. (149,168.)

NEW COMPANIES.

Associated Illustration Agencies.—December 28. Limited by guarantee, 100 members. Liability, £100. To organise the production, printing, and distribution of photographs and pictures, to contract with the British and other Governments, and with newspapers and other publishers, etc. The first members of the Council are:—C. F. Bowden, 45, Essex Street, W.C.; W. J. Edwards, 10, Red Lion Court, E.C.; B. Alfieri, 12-14, Red Lion Court, E.C.; J. W. Hay, 10, Farringdon Avenue, E.C.; E. H. Wroughton, 46, Fleet Street, E.C.; T. King Warhurst, 161a, Strand, W.C.; G. Knight, 5, New Bridge Street, E.C. (manager Illustration Department, Central News).

News and Notes.

Abbott Booty and Co.—We learn that the business of Messrs. Abbott Booty and Company, of which the late Mr. Booty was for many years the head, has been purchased by Mr. G. W. Hilder, who will continue to carry it on, and will, we have no doubt, render the same efficient service to photographers anxious to buy or sell businesses as did his late predecessor. His address is 11, Clarence Road, E. Croydon.

Increased Printing Charges.—A report received by the London Master Printers from the London Costing Committee states that the total increase in charges for printing since the outbreak of war amounts to 60 per cent., in addition to the increased cost of materials—paper, 200-400 per cent.; ink, 50-200 per cent.; strawboards, 300-400 per cent.; millboards, 150 per cent.; glue, 200 per cent.; cloth, 100 per cent.; and leather, 75-125 per cent.

British Industries Fairs, 1918.—As it is possible that the new accommodation for the British Industries Fair (Glasgow), 1918, may not be entirely completed by February 25, and as it is of great importance that the British Industries Fairs in London and Glasgow should be held simultaneously, the Board of Trade have decided to postpone the opening of both fairs for two weeks. Accordingly, the period for which the British Industries Fairs in London and Glasgow will be open will be March 11 to March 22.

Tribunal Appeals.—At the Headington Rural Tribunal, Walter C. Watts (forty), married, B1, 59, Lime Walk, Headington, photographer, asked for further exemption on domestic grounds.

Lieut. Owen said that the military could not give such consideration to domestic cases as they had been in the habit of doing. When they remembered what had happened in France and Belgium they in this country were well off, but it might not always be so if men could not be obtained. Further exemption for one month, final.

Retouching Pencils.—A paragraph in "Assistants' Notes" for December 21 last, as to pencils which may serve in retouching has brought us a reminder from the American Lead Pencil Company, 173, Lower Clapton Road, London, N.E., that they are able to supply a holder of the kind used by retouchers and stock all grades of lead to go into it. Retouchers who may be experiencing difficulty in obtaining the range of leads for their purpose may be glad to make application to the address given above for price lists and further particulars.

The Late Mr. F. A. Bridge.—Since making a reference last week to the connection of the late secretary of the Photographic Convention with music, we notice in the *Hackney and Kingsland Gazette* that Mr. Bridge was for many years superintendent of Henry Leslie's choir, and afterwards acted as choir-master of St. Martin's Church, Ludgate Hill. His first wife, Elizabeth Stirling, was organist of Poplar Church and at St. Andrew Undershaft. At the time of his death, which we now learn was immediately brought about by a fall, Mr. Bridge was seventy-six years of age.

Mounts and Albums.—Messrs. Houghtons, Ltd., send us a copy of their full catalogue, just issued, of photographic mounts. Its 104 pages specify and illustrate the firm's wide variety of both professional and amateur mounts as well as albums and other items of photographic stationery, such as envelopes, negative wrappers, blotting-paper, etc. Inasmuch as prices of these goods have undergone very considerable revision in an upward direction, the catalogue will undoubtedly be in demand on account of its obviating the necessity of correspondence when further goods are ordered. Messrs. Houghtons will send a copy to any photographic dealer or photographer.

The Board of Trade Journal.—With the issue of January 3 the "Board of Trade Journal," in accordance with the more active policy of the newly formed Department of Overseas Trade, appears in a revised form and under the editorship of Mr. Harcourt Kitchin, who, at very short notice, has left the "Glasgow Citizen" and is devoting his wide knowledge of economic matters to the new official organ. The first issue under his control contains a prefatory article by the President of the Board of Trade, Sir Albert Stanley, pointing out the more active work which it is hoped will be accomplished through the "Journal." The issue does itself confirm this hope by its inclusion of articles of interest to the commercial world, in particular one on the provisions and purpose of the new Patents and Designs Bill. The larger page of the "Journal" and its double-column arrangement make for easier reading of its contents in the way of brief reports on foreign trade, openings for British trade, tariff changes and similar items which were familiar in the "Board of Trade Journal" in its previous form. We do not wish to be hypercritical, nevertheless we express the hope that in such reports the technical terms may be those commonly employed in this country. In a paragraph dealing with Swedish export prohibitions we note that "phototype" paper is excepted from other paper, the exportation of which is forbidden. It would be interesting to know exactly what is meant by "phototype" paper.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION AND THE NEW ERA, LTD.

To the Editors.

Gentlemen,—In your last issue, Mr. Mackie, the secretary of the P.P.A., writes to point out what we thought every one knew:—

(1) That the P.P.A. is not a commercial association.

(2) That the New Era is a keen commercial body.

(3) That the one has no connection with the other.

(4) In the summer of last year you kindly inserted a letter in which this statement was duly recorded, and we are grateful to Mr. Mackie for again drawing attention to this fact.

(5) The New Era is a commercial body, out to make good profits for its shareholders.—We are, Gentlemen, Yours faithfully,

The New Era, Ltd.
(Archer Clarke, Managing Director.)

20, Larkhill Rise, London, S.W.4.

BACKED TRANSPARENCIES.

To the Editors.

Gentlemen,—About ten years ago I made some specimens similar to what are referred to in the article on "Doretypes," but I made them either by the carbon process or by collodion transfer, backing them up in some cases much as is suggested. But I found if a backing other than gilt was desired, I got the best results by using an enamel (such as Aspinall's) of the desired tint. When backing with bronze powder I liked that possessing the colour of gold leaf, but I do not think the best results can be obtained by applying with a brush. My method was to coat the transparency, first of all with a thin gold-size, brushing it in with a soft brush. Allowing this to dry till it was "tacky" I then applied the bronze powder dry with a piece of cotton wool, rubbing gently with a circular motion. This method ensures a smoothness and lustre otherwise unobtainable. I thought these were very dainty, but I did not find them "catch on." Perhaps they might "take" now. Yours faithfully,

J. Douglas Ritchie.

25, High Street, Paisley,
January 7, 1918.

BACKING UP TRANSPARENCIES.

To the Editors.

Gentlemen,—The details of the "new style" of picture called the Dore-type, given on page 4 of last week's "B.J.," are most interesting. The new style may or may not catch on, but with such a good backing commercially it probably may. You, however, do well to point out that the plan of backing up transparencies is not new, and your reference to the famous "Proud Turk" ("Proud," I think, not "grand," but I may be mistaken) affair of September, 1893, calls to mind that sensation of the year. How critics and experts gathered in front of Bergheim's picture and guessed again and again—always wrongly—the process employed, and we were all in the dark until the producer of it gave us details and offered to replace the paper backing. After such a sensation, and such an easy method being explained to us, we thought we were in for a good time with a new style, but nobody wanted it, and backed transparencies fizzled out.

The backing-up trick, however, is of a much earlier date. I have before me two excellent examples produced by one Thomas C. Lawrence, of Greenwich, one of which bears the date of 1857. They are, of course, collodion positives. They were first made in the usual way, the whole of the background was then scraped away, leaving the figure upon plain glass; the part over the figure was then blacked at the back and the picture framed up with coloured paper or cloth, or white paper on which was sketched a landscape or other suitable background in water colours. Lawrence boomed them for a time under the name of "Relievos," because of their semi-stereoscopic effect, but his daughter, who gave me the specimens, tells me that he did not make much money out of them, as they necessitated a lot of work, and a considerable amount of artistic skill.—Yours faithfully,

L. T. W.

ASSISTANTS' UNIONS.

To the Editors.

Gentlemen,—In criticising my article of November 9, "Lux" may have written with the intention of throwing light on the matter, as the pseudonym would suggest, but, contrary to the same token, the arguments won't wash. Coal mines are not the only places where employees have a union. An acquaintance of mine, whose trade is much nearer ours than mining, employs two men only, and recently he received a demand from the men's association for an increase of over 50 per cent. to meet cost of living. He must agree or do three men's work himself.

If by asserting that an employee of pluck and independence can help himself, "Lux" means that labour conditions can be benefited by those characteristics, it suggests that the writer has never experienced the sophistical obscurantism that barred the path of many assistants in pre-war days, and is not by any means dead to-day. Certainly an unmarried worker can be independent in normal times—and roam the country from job to job—and the *rara avis* who combines photographic skill with a powerful personality can look after his future by setting up for himself or quitting the profession. This is no use to labour.

To say that a glut of assistants will send wages *up* needs no comment. In normal times "Lux" could have found a crying necessity for reform in many parts of the U.K. and among all classes of the business, and normal times are coming back. I will conclude by saying that I am not a promoter of master v. man, nor yet a disgruntled "twenty-five bobber," and I stand to gain probably nothing by the forming of a union. No, gentlemen, I am out for the benefit of decent photographers, employers and employed, and I want to think that in future days "P.P." will be universally interpreted as professional photographer and not as proprietor of premises or penurious pauper, two expressions I have heard more than once, which hardly tend to raise the prestige of photography.

Thermo.

CO-OPERATIVE PLATE-MAKING: THE NEW ERA, LTD.

To the Editors.

Gentlemen,—We much regret that through an oversight your Ex Cathedra paragraph in the issue of December 28 last did not come before us until too late to reply to it in the "B.J." of January 4.

But now taking up the four points—factory, machinery, chemical supervision, and raw materials—in regard to which you ask for full and precise information, we would say, in respect to the first two, that the plan of the proposed works has just come into our hands. The executor of the estate will only sell the freehold premises, and the option expiring in a few days, the opportunity of securing a completely fitted factory admits of no delay. It is desired to form a small syndicate to purchase this property, and to lease the premises, with option of purchase, to the New Era Company. The rent to be paid will be the same amount as that paid to the late owner. This will give a return of 15 per cent. on the investment, and thus the syndicate will be landlords of their own freehold premises, complete with machinery, coating machines, boiler, engine, ice plant, dynamo, lifts, washing tanks, emulsion press, ventilation tubes and fans. There is also a reasonable quantity of usable stores, such as glass, gelatine, plate-boxes, paper and packing cases, all included in the purchase price. The directors of the New Era are in a position to pay this money, but it would unduly strain their resources. Therefore, they suggest that it is to the interest of every professional photographer to state what amount of capital he would be disposed to put into the syndicate. Each £1 will be payable in five monthly instalments of 4s., commencing February 1, and the first of each month following, as the directors would pay the cash down, and so secure the 15 per cent. for the syndicate.

As regards chemical direction, the services of a thoroughly skilled emulsionist have been retained, and other staff engaged. So far there has been no difficulty in obtaining the necessary chemicals; the Ministry of Munitions has placed us on the list for paper and other materials, and as regards glass, should there be a shortage, we presume we should be in the same position as other plate-makers. Last month we had nearly a thousand pounds' worth offered us at quite a reasonable price.

The real shortage at the moment is money, as more than half of our subscribers have been called to the colours, and consequently are unable to fulfil their pecuniary obligations as stated in our letter to our shareholders in a circular letter dated December 15, 1917.

While we are writing, we may correct an impression which has arisen in some instances, so we learn, in regard to division of profits between ordinary and preference shareholders. While preference shareholders are guaranteed a return of 6½ per cent., they will also share the profits equally with the ordinary shareholders on a basis shortly to be determined, according to the extent of their holding in the New Era, Ltd., and the amount of their purchases.—We are, Gentlemen, yours faithfully,

The New Era, Ltd.
(Archer Clarke, Managing Director.)

20, Lackhall Rise, London, S.W.4.

Wellington Calendars.—We are glad to find that the restrictions on the use of paper-making materials have not altogether deprived photographers of the very tasteful wall calendars which Messrs. Wellington and Ward have in the past been in the habit of distributing. This year, in deference to the wishes of the Controller of Paper, a much smaller number of these calendars have been prepared, but any professional photographer or photographic dealer who has not received one will, if possible, be supplied on application to Messrs. Wellington and Ward, at Elstree, Herts. The calendars take the form of a handsome art board, measuring 12 by 10 inches, and bearing, in addition to a monthly tear-off calendar, a photograph serving to remind the recipient of the qualities of the firm's products. In the case of one of the calendars kindly sent to ourselves, the subject is one of the charming studies of children by Mr. J. B. B. Wellington, which we have had occasion to admire at recent exhibitions.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

Photo-Engraving.—The head of the R.F.C. School of Photography is Capt. P. R Burchall, Training Division R.F.C. Photo-Section, South Farnborough. Hants, but you appear to assume what, we believe, is not the case—that appointments to the school are made from those not already in the R.F.C. Photo-Section. There is no school of photo-engraving officially connected with the Army or Navy.

N. D. E.—We believe the material of the Agfa flashlight is thorium nitrate mixed with an equal weight of magnesium: or cerium nitrate in the same proportion. This is the item from the patent specification, but it is most likely that the powder does not correspond exactly with it. In the "B.J." of April 26, 1912, there is a lengthy article on flashlight powder, which gives the materials and the proportions used in a large number of German powders according to the specifications.

W. E. B.—If you trade under any other name than your own you come within the scope of the Business Names Act, and require to register. So long as you register, and observe the orders of the Act in the way of putting your real name on stationery, you are not infringing the Act. The mere fact that you give a certain title to a building or an address is not a question which comes within the scope of the Act, or, broadly speaking, of any Act. It is a question of your trading under a given name which you have to consider.

A. V.—We fear there is no remedy which is in the least degree certain for the removal of the stain from the twice-intensified negative. There would be no harm in trying a further bleach, and printing as you suggest on a vigorous gaslight paper, but it would want to be a very vigorous paper in order to get ample contrast from a bleached negative, at any rate from a negative of something like ordinary vigour. It is difficult to guess what the stain consists of, but we should judge that it is not a developer stain, and therefore anything in the way of the usual clearing formulae is likely to be of no practical use.

S. L. C.—A three-wick lamp is a very poor lantern illuminant, and you cannot expect to get a really brilliantly lit 8-ft. disc with it. With a good spirit vapour lamp, like the "Luna" of Hughes and Co., you can depend on a really brilliant disc of 10 or 12 ft. But the lamp of this type burns methylated spirit. If you can get spirit it is quite easy to use and regulate the light. We can understand that a lantern for an oil lamp is fitted with a long chimney, and the latter is necessary in using the oil lamp. It wouldn't do to cut it down while you are using the lamp, but with any other form of light such as spirit vapour or acetylene the tall chimney could be replaced by a simple light-excluding cowl.

F. S. Wheeldon.—No one lens is really suitable for so many different purposes. If you must have one only we should say you had much better choose a good $f/6$ anastigmat. While you sacrifice something in speed you gain much in the way of the definition required in the outdoor work. Neither of the two lenses you name is up to much. Your best course would be to get a secondhand anastigmat by a leading maker from one of the secondhand firms. About the best focal length would be 9 inches, although this would be awkwardly long in confined situations. Here again you are asking too much of one lens. For many of the purposes you name you would want a lens of 5 inches focus on a half-plate.

Copyright in the United States.—If an Englishman automatically obtains rights in America, does he need to register his copyright at Washington? It is clear to me from the handbook you have issued, and also from the copy of the American Act dealing with copyrights, that it is necessary for American subjects to register their pictures if they wish to obtain protection in U.S.A., and I cannot think that an Englishman, without taking any trouble or going to any expense, will obtain rights in America. Furthermore, unless the pictures are registered in Washington, it would be very difficult for the U.S. Government to give him any protection, even if they had every wish to do so.—C. N.

It is not possible to answer your question specifically, because it assumes conditions which, according to our reading of United States copyright law, do not exist. In this country, under the 1911 Act, copyright is (to use your words) automatically created by the making of the work—literary, artistic, etc. But in the United States it is necessary for the creation of copyright to observe the formalities in the way of registration at Washington and marking all copies in the case of artistic works. It is not automatic. This difference requires to be borne in mind in interpreting the U.S. 1909 Copyright Act in regard to what this latter says as to copyright, which may extend to those who are not citizens of the United States in that country. This Act says that such rights may extend to aliens who at the time of first publication may be domiciled in the U.S., and also to subjects or citizens of other countries having reciprocity arrangements, as regards copyright, with the U.S. We do not think there is any reason to suppose that the alien domiciled in the U.S. will be excused the formalities of registration at Washington, etc., and therefore the alien who obtains copyright on the basis of a reciprocity arrangement between his country and the U.S. would, we think, equally be required to comply with the U.S. rules as regards registration.

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The Summary of contents which usually occupies the lower half of this column will be found at the foot of the page overleaf and will continue to be placed there whilst its regular position is required for notices relating to the forthcoming "B.J. Almanac."

The First of the 15,000.

It is always something of a satisfaction to us to get the first finished copy of the Almanac. We are getting on. At any rate, the binders have a stock of all the "sheets" which make up the book, and, given a chance, will keep busy in placing them within the familiar yellow or green covers. In ordinary times we could depend on their getting out two or three thousand a day; now their daily output is measured in hundreds, and may be reduced to nothing every now and then by peremptory orders to concentrate all their staff on work of military urgency. Nevertheless, we have reasonable hopes that in the early days of next month there will be thousands enough of the 1918 Almanac to fulfil the orders throughout in the United Kingdom.

Our fourth war-time Almanac, for all its rationing, is still a volume of 660 pages. We daresay that many people will prefer it to the issues of over 1,000 pages, which in pre-war times were unique, we believe, among trade publications. Actually its text-portion omits nothing for which its readers will look. The occasion for certain sections, for example, reviews of new apparatus, has gone, but to all intents and purposes the Almanac continues to be the up-to-date "enquire within upon everything" which has been its character for years past. We must try to find space in our advertising pages for extracts from the "Contents" in order to show the number and diversity of the subjects dealt with in the forthcoming issue.

Smaller bulk has been conditioned chiefly by the smaller size of advertisements—in part our publishers' own restriction—but the number still provides a survey of the British photographic trade, and our readers can render a real service to this country and to friends in neutral States by sending a copy of the Almanac to tell its tale of British resources. Under the regulation of the Postal Censorship such copies can be sent only through the publishers of the Almanac.

EX-CATHEDRA.

Sulphide Toning. A writer recently stated that "in theory" a sulphide-toned print should have the same colour whether toned by a direct or an indirect process, but we fear that neither theory nor practice will quite support this statement. In a direct process, such as the hypo-alum or liver-of-sulphur, we operate directly upon a black silver image, therefore at any intermediate stage of the process the image is a combination of a brown with a black deposit. In the indirect process we work upon a white silver-bromide image, and in this case, at an intermediate stage, the image is a mixture of a brown and a white deposit, and is necessarily of a different tone from the intermediate image produced in a direct process. If both processes are carried to the extreme so that brown silver sulphide alone exists most probably both will be of the same colour, but while the indirect process is a rapid one, and therefore speedily reaches what appears to be finality, the direct process is always a slow one, and probably very rarely, if ever, is allowed to reach a similar stage. In any case, operations of similar type seldom reach finality, a little of the original deposit always remaining. The bleached image cannot be completely re-developed, and it is not likely that it can be completely sulphided. Neither does it seem likely that the black silver image can be completely changed by a direct sulphiding bath. Theory, therefore, suggests that in each case a little of the original deposit is likely to remain unchanged, and a very little black metal in the one case, or white bromide in the other, will be enough to cause considerable colour variation.

* * *

The Miniature Reflex. A suggestion in the "Scientific American" that a pocket reflex camera would be a great boon met with the disapproval of our correspondent Mr. Graham M. Nicol, but nevertheless we think the idea not at all unworthy of consideration. We have had considerable experience with one of the small 4½ x 6 cms. pocket cameras, and it is an undoubted fact that there are many occasions on which it would be highly advantageous to be able to make sharp focus perfectly certain. Our American contemporary appeared to have in view a folding type of instrument, but this complication seems hardly necessary in view of the fact that our camera can be carried quite easily in a side pocket even when fully extended. There should be no great difficulty in making a miniature reflex with a focussing flange front, and lens shutter of the Bebé type, that should be no larger than the extended camera as it now is, and the complications of the ordinary reflex could be dispensed with. A folding type no bigger than "a pack of cards" would doubtless be an improvement, but until such a type is designed we think a miniature non-folding reflex would be a distinct advantage, and we think a very popular introduction. Of the popularity of small plate cameras there is no doubt whatever, and any real advance in design is sure to be welcomed.

* * *

Missed Business. One of the industries which have been fostered by war-time conditions is that of the cheap enlargement, which seems to be flourishing to such an extent that it can afford to take a decent-looking shop to display its outrages on portraiture. This is detrimental to the interests of the legitimate photographers who possess the original negatives and could produce a much more satisfactory result. We fear that this state of things is due to the fact that many photographers charge too high a price for enlargements, while others whose charges are reasonable do not make a good show of their work, and also do not display prices, so that possible customers who would willingly pay a guinea gravitate to the cheap man who loudly trumpets "this size for 3s. 6d.," and having by this means secured a nibble, books an order at a very much better price. Of course this is legitimate trading on his part, but it is up to the more reputable of the photographic body to endeavour to keep a decent class of customer from drifting away from them. We believe that much could be done by showing special lines of " service " sitters, male and female, and also emphasising the fact that any photograph could be reproduced. As it is, many people are afraid to take a dilapidated postcard into a prosperous-looking studio, and so the work falls into the hands of the enlargement shopkeeper, who is often only an agent for a trade sweater.

* * *

Supplementary Lighting. There are many operators who are either unaware of, or prejudiced against, the use of artificial light in conjunction with daylight. Yet the practice is a very old one, and has many advantages. It is particularly useful where a studio has a sidelight only, which answers well enough for heads and three-quarter lengths, but gives unequal illumination when full-lengths and groups have to be made. In such cases a supplementary toplight takes the place of a glazed roof, giving effects indistinguishable from daylight and considerably shortening the exposure. For this purpose the best arrangement is to use the light of an arc or half-watt lamp reflected from the ceiling, no direct rays being allowed to reach the sitter. The lighting is, of course, very soft, perhaps too much so to be used alone, but conjointly with a more direct light either of the same class or daylight it is quite satisfactory. The necessary fittings are simple. One, or better two, lamps are hung as near the ceiling as possible, the lower part being screened off by a hemispherical reflector which directs the light upwards and gives the " white cloud " illumination which is so highly appreciated by the portraitist. As regards curtains, head screens and reflectors, the combined light may be treated as if daylight only were being used. One advantage of fixing two or more lamps is that the lighting may be modified by switching off one or other of them instead of cutting off the light by means of screens.

* * *

Design Copying. A small branch of photography which might well be developed by photographers in manufacturing districts is that of the duplication of designs and drawings by photography. The work is very easy as it is mainly confined to line subjects, and the quality and colour of the image are of little importance provided that absolute accuracy of the lines and correctness of scale are ensured. It is still the practice in many factories and even in some lithographic establishments to rely upon hand copying for this class of work, but if such manufacturer can be convinced that they can obtain greater accuracy in a shorter time at a fraction of the cost they are likely to patronise the photographer. Non-distorting lenses must, of course, be used, and it is desirable to work as much as possible with cameras set to reproduce to a given scale both for making the negative and the enlarged or reduced bromide print. As an example of the sort of thing that is wanted, we may instance a rather elaborate diagram consisting of a number of graphic curves with notes and figures on the squared paper. A subject of this kind, which took a skilled man three days to copy (the size was 40 by 22 inches), was copied in both the same size and to half-scale in three hours, and the photographer was well paid by receiving a third the cost of the hand-drawn copies. Most factories and drawing-offices now possess blue print or ferro-gallic apparatus for plan copying, but this necessitates a tracing being made. This is never so sharp as the original, and requires careful checking as to dimensions and details. The camera method takes the original as soon as it leaves the draughtsman's hands, and copies can be delivered before a tracing could be done. The work should be charged for on a commercial basis at, say, three times the cost of the materials and labour expended. An isolated job naturally would not be worth doing, but if only three or four plans per week came in an appreciable addition to the profits of a business would result in a year. Quickness in delivery is a necessary feature in work of this kind. It is useless, in most cases, to put a job aside to be done when some spare time is available. Fortunately a camera and a few electric lamps by which such copying can be done at a moment's notice call for

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SUMMARY.

A paper recently read before the Society of Motion Picture Engineers in New York is an excellent contribution to the more scientific control of the intensity of illumination in the projection of cinematograph pictures. It has its application also to ordinary optical projection. In both these spheres methods of control by measurement have hitherto been largely neglected. (P.29.)

Mr. G. C. Weston, in a contributed article, describes the construction of a light but breakage-proof box for the postal carriage of lantern slides. (P. 28.)

We regret to announce the death on Tuesday last, at the age of forty-five, of Mr. C. H. Hewitt, for many years instructor in photography at the Photographic School of the Regent Street Polytechnic. (P. 31.)

Some practical hints on repairs of photographic apparatus, such as can be carried out by the photographer himself, will be found in an article on page 27.

Business in enlargements often goes to the cheap tout, sometimes from photographers' excessive prices and in other circumstances from lack of bringing before possible patrons of a studio the service they can there obtain in the way of enlargements. (P. 26.)

A national scheme of reconstruction is in contemplation whereby electric current should be greatly cheapened and much more widely distributed. Even if the large claims made for the scheme are proved not to be realisable, there is little doubt that in the future the legislative obstacles to the distribution of electric energy will be in large measure overcome. (P. 27.)

A glance at the essential differences between direct sulphide toning, as in the hypo-alum process, and that of bleaching and sulphiding is taken in a paragraph on page 25.

A daylight studio which is defective from lack of top-light may be made satisfactory in this respect by the suitable installation of an artificial top-light. (P. 26.)

The copying of manufacturers' working drawings, etc., may form a small side-line of the photographer's business if it can be done promptly and at commercial rates. (P. 26.)

At the Bath County Court last week an action was heard in reference to a dispute, in which two lady photographers were the plaintiffs, as to what constituted a basement. (P. 34.)

A recent patent specification describes an installation for the machine development, fixing, washing, and drying of cinematograph films. (P. 32.)

little outlay and a corner can usually be found for the installation where it will be always ready to hand.

CHEAP AND PLENTIFUL ELECTRICITY.

Among the matters which have had the attention of the Ministry of Reconstruction is the conservation of our national supplies of coal, a question which has been delegated to a Committee (the Coal Conservation Sub-Committee), which has now presented an interim report. Certain of the features of this report are of such a sensational character—or, perhaps, it would be more correct to say have been rendered sensational by the daily Press—that some comment upon them appears necessary. Such comment is not out of place in a photographic journal, inasmuch as the report of the Coal Conservation Sub-Committee is largely a recommendation of a national scheme by which electricity shall be rendered both plentiful and cheap; and it is hardly necessary to point out that photographers, as consumers of electric current for both light and power, are interested in developments such as these. According to the interim report, it is stated that in the United Kingdom eighty million tons of coal are consumed for the production of power at a cost of £40,000,000 at the pit-head. It is declared that by an up-to-date and national scheme of electrification fifty-five million tons of this coal could be saved, equivalent to £27,000,000. Other means of conservation in the way of recovering by-products would effect altogether an economy of £100,000,000 a year. The proposed scheme is, therefore, to put down a small number of immense power stations on sites favourable for the delivery of coal and water, and from these to distribute electric supply by trunk lines throughout the country. Apart from its financial economy, such a scheme would clearly confer enormous benefits upon the community. It would, if realised, abolish the smoke and atmospheric pollution of large manufacturing centres and would contribute to the prosperity of many minor industries by the greater cheapness and wider distribution of electric power. At the same time, the obstacles in the way of the scheme are numerous enough to subdue the hopes of any overnight revolution which will usher in an industrial millennium. In the first place, sites for such power stations have to be found where both water and coal—the one is as essential as the other—are easily accessible. In the second place, existing electric power stations would have to be scrapped: and, thirdly, it would be necessary to ascertain fully the economic benefit which such a scheme would confer upon the country as a whole in relation to the service in the way of the supply of light and power which is at present being rendered by the gas companies and is now obtaining a higher measure of importance in reference to the recovery of all kinds of residual products and their utilisation in the chemical industry.

Whether the scheme as a whole comes into being or not it may, at any rate, be taken as certain that the next few years will witness a greater distribution of electric current and a removal of the legislative influences which for thirty years have hampered the electrical industry and have been the cause of the chaotic and often uneconomical condition into which the undertakings for generation of electric current have come. Photographers have good reason for watching such developments and giving them any such support as, locally, they are able to do. The measure of our backwardness in this country in the distribution of electric current is to be found, apart from many other signs, in the number of places even of considerable size where no electric supply is available. It may be believed that with a larger view of the importance of cheap and plentiful electric current, there will scarcely be a photographer in the country who may not, if he so wishes, instal electric light in his studio. And when that is the case there will be many further applications of electric motive power in the business of photography. It is not too much to anticipate that a clean and convenient form of power, such as is available in an electric motor, will prove capable of displacing a great deal of the hand labour which is now employed in printing, washing, and drying photographic plates and prints. In the matter of electric heating we still have a long way to go; electricity will have to be a very cheap thing indeed in order to become as economical as gas or certain solid fuels for the warming of premises.

THE REPAIR OF APPARATUS.

Various little repairs, such as that recently described by a contributor who repaired a leaky dark slide by seccotining washleather round the rebate, are usually necessary at periodic intervals. Slides will develop light-leaks as will also cameras, while dead black wears off and screens become loose in course of time. Referring more particularly to the special trouble of our correspondent, we may point out that a double dark slide that is well made in the first instance should not develop leaks around the edges as the result of fair usage. If properly designed the two halves will so fit into each other that even a considerable shrinkage of the material will not let in light. If, however, from any cause this trouble does occur the first thing to look to is the hinge or hinges; the effect of the shrinkage can often be remedied by taking off the hinges and refixing them after plugging the old holes with wood plugs glued in. The alternative method of lining the rebates should only be resorted to when the re-setting of the hinges and catches will not remedy matters, and then care must be taken not to use too thick or too stiff a material: otherwise the hinges will be badly strained and perhaps broken. Our correspondent used washleather, which is excellent if of the right thickness, but too often this material varies in thickness, being much thicker in some parts than others, and then it is not very suitable. An excellent material for this and similar purposes is suède leather. A fine surfaced thin cloth is also very often useful, while even blotting paper is not to be despised. In fact, this last material is very useful, as it can be obtained in various thicknesses, is very well adapted to the purpose, and lasts well if not handled too roughly.

The most usual place for a light-leak is, however, at the light-trap where the shutter draws in and out, and as this trap nearly always depends on a strip of velvet or plush that in time becomes worn down a repair at this part is more often necessary. Moreover, similar light-traps exist in other parts of photographic apparatus, and so repairs of this type are often required. Sometimes cloth takes the place of velvet or plush, while very varied thicknesses of material are required to make equally good fits everywhere, and therefore it is advisable to collect odd bits of velvet, cloth, or plush, and keep them handy for repair purposes. Various thicknesses are best provided for by mounting the material upon paper or card of varying substance; when so mounted it is easy to cut off strips as required. Beginners generally spoil the material at their first attempt by allowing the adhesive to penetrate through to the surface and destroy the pile. If velvet is glued directly into the place prepared for it, usually a groove in the wood, it requires considerable care to avoid getting glue on the surface; the use of mounted material renders the task much easier. The paper or card should first be coated with seccotine or glue, and then the layer of adhesive smoothed over with a straight edge. The material is then rubbed lightly down and the whole allowed to dry under slight pressure. The grooves for the light-stopping material should be carefully prepared. The old velvet can be torn out, and remaining fragments, together with the old glue, scraped away. Care must be taken not to cut into the wood and spoil the groove: hence it is best to use a scraping tool, and not a sharp-edged cutting one such as a chisel. The re-velveting of light-traps is a perfectly easy operation and a very necessary one that every photographer should be able to do for himself. It should not be forgotten that while velvet forms a good light-trap it is also an excellent dust trap; therefore, whenever it can be got at readily, it should be subjected to a careful regular brushing. A soft-haired toothbrush is good for the purpose. The brushing not only removes dust, but raises the pile, which is apt to be burnished down by the friction of the parts which slide over it.

Pinholes in bellows are troublesome defects, and the only effective way of dealing with them is to patch them from the inside with a piece of opaque black cloth. They can be prevented from appearing by keeping the leather in pliable condition. To do this a good dressing should be occasionally applied, while the camera when not in actual use should be kept carefully in some place which is not liable to extreme changes of temperature. Further, it is not advisable to fold a camera tightly up and put it away for a long period. It is better to leave it just slightly extended, but well wrapped up in a focussing cloth. Tight folding is very apt to cause the corners of the folds of the bellows to wear out, and these are most awkward places to repair.

When overhauling apparatus all screws and brasswork should naturally be looked to. Loose screws in woodwork should be replaced by those a gauge fatter if possible, but if this cannot be done the old hole should be plugged and a new one made through the plug. If very loose a wood plug should be glued in; if only slightly loose a cork one will often do all that is required.

Dead black is invariably required at regular intervals, even though the majority of photographers neglect this very simple matter. In nine cases out of ten it will be found that a careful re-blacking of worn places will result in the production of cleaner negatives, for reflected light plays a large part in fogging or veiling the image. An innocuous black containing no turpentine should be used: the popular one of lampblack mixed with dilute celluloid varnish is as good as any.

Shutters also go wrong, but most of these are far too delicate things for the photographer to try experiments upon. A roller-blind shutter is simple, and it is perfectly easy to fit it with a new blind, which is the repair most usually required; but focal-plane shutters and lens-shutters generally require experience and skill, and should be put into the hands of experts if anything goes wrong.

A LANTERN SLIDE-BOX FOR POSTAL TRANSIT.

The safe transit of a set of lantern slides for lecture or other purposes to different parts of the country is a problem that has received a certain amount of consideration from time to time. Several types of box can be obtained for sending such sets by carrier or rail, but in order to afford adequate protection to the slides from the severe handling parcels generally receive en route, the boxes must be somewhat heavy in construction and bulky to handle. The cost of carriage therefore amounts to an appreciable item, especially if they have to be sent any distance.

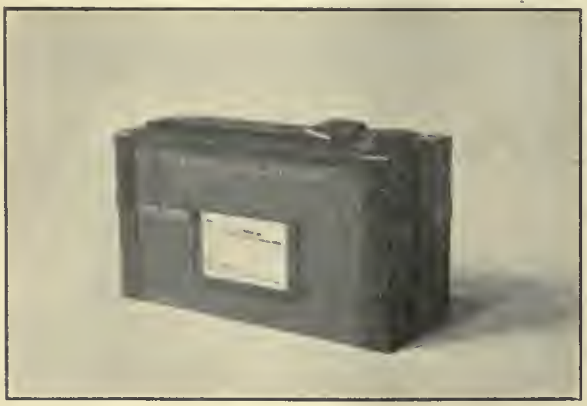

Fig. 1.

Most attempts made to cut down the weight or bulk of the box result sooner or later in damage to the contents.

The writer was asked by an organisation which sends a large number of lantern slide lectures about the country to attempt some improvement on existing methods which, owing to the above causes, had occasioned trouble.

The Parcel Post service suggested itself as a comparatively cheap method of transit, especially for the longer journeys, and it was necessary to ascertain if the limit of weight permitted the construction of a box that would afford sufficient protection for a reasonable number of slides. It was found that the majority of the lectures were composed of about sixty to seventy slides, and this applies pretty generally to the average lecture. This number of slides weigh from 6 to 7 lbs., leaving a margin of from 4 to 5 lbs. for the box, etc., to bring the whole within the maximum of 11 lbs. allowed by Parcel Post.

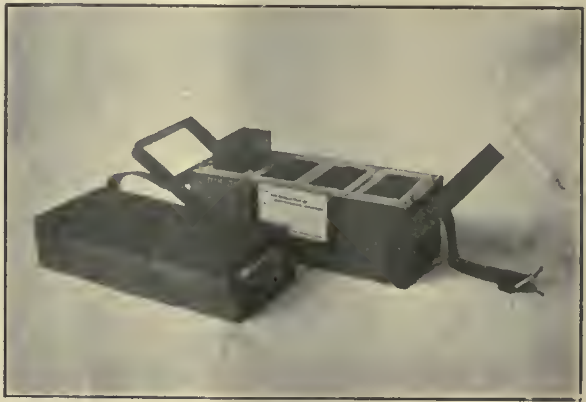

Fig. 2.

A box that was considered capable of giving suitable protection for this number of slides, also of sufficient strength to withstand the knocking about likely to be encountered on the journey and coming within the above weight, was designed. It is illustrated in Figs. 1 and 2.

It is made up in ½-inch American whitewood, with all joints halved, glued, and dovetail bradded or screwed. The lower part is divided into four compartments, each of which is lined on the bottom and all four sides with ½-inch wool felt; each compartment will take sixteen or seventeen slides, which fit in without any shake, and are well protected by the thick cushion of felt all around them; sixty-eight slides are thus accommodated.

The upper part has the interior lined with the same thickness of felt, and fits on in the customary manner, being held in position by four hardwood pins, in addition to hinged iron straps 1 inch in width at each end. The upper part of the lid contains a separate compartment for holding the manuscript or descriptive notes, and is closed by means of an end-piece affixed to one of the iron straps. A stout leather strap encircles the box lengthways, and, when fastened, secures the whole and forms a convenient handle for carrying.

Provision is made on one side of the box for taking an address label, which is slipped into a recess when the box is open, and prevented from falling out by the act of closing the box; such a label can be reversed for use when returning. The outside dimensions are 12½ in. by 7 in. by 5 in. When filled, the weight complete just comes within the limit of 11 lbs., so that it is neither bulky nor heavy to carry. It can be sent by Parcel Post anywhere in the United Kingdom for 1s.

By payment of a registration fee of 2d. in addition, a certain security against loss is obtained, and it is much the best plan to do this. Eyelets are provided in the ends of the strap for inserting a piece of string or wire so that the ends can be tied and sealed. This not only gives security against the contents being tampered with, but is necessary when the parcel is registered; such a box will be accepted at a post-office without any additional covering or fastening.

An experimental box was subjected to some pretty severe tests before being put into service to ascertain if it afforded sufficient protection to the contents. After being filled with slides it was thrown down a stone staircase and dropped from some height, but no damage was found to have taken place. Boxes have since been sent out on several journeys through the post without any breakage or cracking of the slides.

A smaller box made on the same lines, having a capacity of about forty slides, weighs eight pounds, and can be sent by post for 9d. This meets the case of a lecture with a smaller number of slides; and by sending out two boxes, one of either size, lectures of 80, 100, or 130 slides can be accommodated at a moderate cost for carriage.

G. C. WESTON.

STANDARDS AND CONTROL IN CINEMATOGRAPH PROJECTION.

[The following paper, recently read before the New York meeting of the Society of Motion Picture Engineers, so admirably applies methods of scientific measurement, not only to cinematograph projection, but also to that with an ordinary optical lantern, that it is deserving of a most careful reading. It embodies still another application of the comparatively young science of the illuminating engineer to the improvement of the conditions under which we live. We feel pretty sure that not one cinema theatre in a thousand in this country ever thinks of measuring the illumination on the projection screen, and of adjusting it for the best optical comfort of the audience, to say nothing of the artistic presentation of the film pictures. Mr. Caldwell, after first drawing attention to the different types of projection screen, suited to theatres of different form, proceeds to set forth some approximate standards for the illumination of a cinema projection screen with the shutter open and no film in the machine. It is a comparatively simple operation to make these measurements with instruments which have been designed for the purpose within the past few years. And obviously the same control of what we may call the "bare illumination" of the screen—i.e., without the slide in the lantern stage—is advisable in the use of an ordinary optical lantern. The screen-illumination requires to vary according to the transparencies which are being shown. For example, Autochromes will do with a screen illumination which, in the case of ordinary slides, would cause discomfort. Further, the paper discusses improvement in illumination and in the avoidance of flicker by the use of a tungsten lamp in place of an arc as the source of light.—Eds. "B.J."]

THE subject of light-intensities for motion picture projection, is one of very real importance, but concerning which there is a scarcity of data.

First of all, it is of interest to note that the eye sees a picture on the screen not by the light which strikes the screen, but by the light which the screen reflects to the eye. If we imagine a perfectly black screen—one which reflects no light at all—we see at once that, no matter how strong the beam we project on the screen, we will obtain no picture at all. Screens used in practice vary in reflection factor—that is, in their power to reflect light, through very wide limits; hence it is obviously necessary to consider the reflection factor of different screens when discussing screen intensities. Nor is it correct to assume that the screen which reflects the highest percentage of the light striking it is necessarily the best screen to use, for the manner in which the reflected light is distributed is also a factor which affects the brightness of the picture. For example, it is possible to conceive of a screen which reflects a very large proportion of the light striking it, yet which, due to the fact that it distributes the reflected light far out to the sides, is actually less satisfactory than one which reflects a lower percentage of the light striking it, but which confines its reflected light within useful angles.

From the standpoint of their reflection characteristics, screens in common use may be divided into two classes:—

(1) Diffuse reflecting screens;
(2) Spread reflecting screens.

Of the first class, white cloth screens and plaster screens are typical. A white cloth screen, when clean, can be made to reflect as high as 70-75 per cent. of the light which strikes it, and a plaster screen 80-88 per cent. The light is reflected at wide angles, as shown by the diagram Fig. 1. Such screens are well adapted to theatres in which the position of the seats with respect to the screen is such that the picture must be viewed at relatively large angles, for no matter from what angle the screen is viewed, the brightness is the same because of the way in which the light is reflected.

Aluminiumised screens and ground-mirror screens are examples of the spread reflecting class. A clean aluminiumised screen can be designed to reflect about 60-65 per cent. of the light striking it, and will confine the reflected light within an angle of approximately 30 deg. Ground mirror screens when clean can be made to reflect approximately 80-90 per cent. of the light and confine the light within about 30 deg. Such screens are well adapted to theatres in which the seats are so arranged that the picture does not have to be viewed at large angles.

Fig. 1 shows the relative brightness of matt, metallic-surface, and ground-mirror screens when viewed at various angles.

Allow me to emphasise the point that the reflection factors I have mentioned assume a clean reflecting surface; a very slight accumulation of dust can reduce the screen brightness very materially. I believe that with a schedule of regular and frequent cleaning theatre managements can in many cases increase their screen brightness by fully 50 per cent. of their present average values if they desire to do so.

Thus, it is sure that the intensity of the beam projected determines only relatively the brightness of the picture.

Uniformity of screen illumination is another factor which must be considered in connection with screen intensities. It is not uncommon to find screens upon which the intensity near the centre is several times the intensity near the edges of the picture, or where the intensity on one-half of the screen is much higher than upon the other half. When this condition of non-uniformity obtains, certain portions of the picture are, of course, brighter than others, and while the eye cannot readily detect small differences in brightness, the fact remains that to say a screen is illuminated to a certain average intensity is not definite when a wide difference exists between minimum, average, and maximum intensity values. Good projection requires a screen intensity approaching uniformity, and the nearer the intensities at different points come to being equal, the better will be the projection from this standpoint. The uniformity of intensity at different points on the screen is affected by the condenser design, steadiness of the light, and by refinement in focussing adjustment.

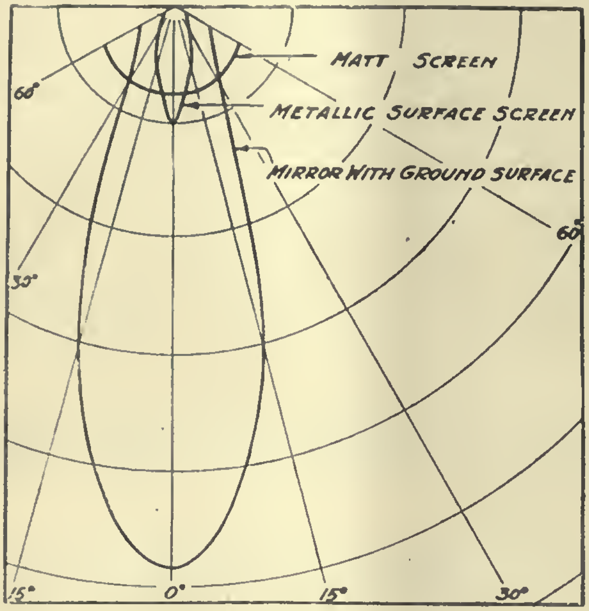

Fig. 1.

Another factor which we must consider is extraneous light. Obviously a higher screen intensity is required in a theatre in which daylight is allowed to enter, or where lights are kept burning at all times, than in one where all the light comes only from the projection apparatus. The effect of extraneous light is to decrease the contrast between the high lights and low lights on the screen. If, for example, the intensity of the beam in a low light of the film is, say, 1/50 of a foot-candle at the screen, and in the high lights the intensity is, say, 2 foot-candles, the contrast is 1-100. If upon the screen image is now superimposed an intensity of 1/10 of a foot-candle, due to extraneous light, the contrast becomes approximately 1 to 17. From this it is apparent that even a very low intensity of extraneous light calls for considerable increase in screen intensity if good contrast is to be secured.

Before leaving the subject of contrast, I wish to mention that film-producers are endeavouring to a greater and greater extent to provide the proper degree of contrast in their films. More and more care is given to lighting their scenes in such a way that with a projecting beam of normal intensity the proper gradations of light and shade will appear on the screen.

The use of tinted and toned film is becoming more extensive: This tinting and toning serves two purposes: it lends colour to the scene, and it reduces the intensity. Usually, the producer has both of these effects in mind. He uses a blue tone, let us say, to portray a moonlight scene. The colour gives the observer an impression of moonlight; the producer intends in all probability that the low intensity shall help in furthering this impression. If then, the operator, seeing that the picture is not perfectly clear, sends a rush of extra current through his carbons he kills to an extent the impression that the producer hoped to convey. I have talked with producers who consider this natural tendency of the operator to be a matter worthy of no little consideration.

Data which I have obtained on the transmission of samples of tinted film may be of interest.

Percentage absorption of light by various tints of films:—

Film.	Per cent.
Black	9
Yellow	21
Light amber	22
Heavy amber	33
Light blue	33
Dark blue	40
Green	53
Purple	62
Orange	67
Red	79

The illumination on the screen with the shutter stationary and no film in the machine has been taken as 100 per cent. The values for the tinted samples are given in percentage of light-absorption due to the different tints. The values given in the table represent tests on a single sample of each tint, and while these samples are believed to be typical, others might, of course, show somewhat higher or lower values.

In view of the foregoing general discussion you will not be surprised when I say that suitable intensities for motion picture projection range probably from as low as 2.5 foot-candles to as high as 30,* depending upon local conditions. I do not think that 2.5 foot-candles is sufficient for the projection of a dense film on a dusty muslin screen; neither do I think that an intensity as high as 30 foot-candles is desirable for a light film projected on a highly selective or spread reflecting screen. I know of cases where theatre managements have been forced, through the complaints of their patrons, to reduce the intensities they were employing from a value near the upper limit of the range I have given to a considerably lower one. If muslin or plaster screens are used, and these are faithfully kept clean, I believe an intensity of 5 foot-candles should be ample for the proper projection of all except very dense films. If an aluminium-sized or ground-mirror screen is employed a value of 2½ foot-candles should be ample. A great many theatres are projecting pictures with less than 3 foot-candles, using a plain screen, while the largest and best-known theatres are obtaining less than 10 foot-candles on a plain screen.† The distinction between dense films and tinted and toned films is of interest. In the former, the density is due to variation in exposure and development, and is not as a rule obtained with a definite purpose; in the latter, the purpose is to lend colour to the picture and to control its brightness. I believe that an intensity of 5 foot-candles on any good, clean screen will be sufficient for the projection of any film sent out by a competent producer, and I also believe that no discomfort will be experienced from intensities in the neighbourhood of 10 foot-candles. In giving these values I pre-suppose the intensity due to the general illumination of the theatre to be of a very low order and assume the measurements to be made with the shutter open and no film in the machine. As I have previously mentioned, the effect of extraneous light in decreasing the brilliancy of a picture is very marked.

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* Gage, S. H. & H. P. "Optic Projection." 1914.

† Optic Projection, J. A. Orange. Trans. I. E. S., Nov., 1916.

In this meeting we are interested in projection apparatus only in so far as the component parts of the two systems, arc-lamp and Mazda lamp, affect screen intensities. I shall discuss these two systems very briefly from this standpoint.

Fig 2 shows the arc-lamp system as it is now, and as it has been for a number of years. The light-intensity at the screen with any system is, of course, dependent upon the light given off by the source, and with both arc-lamp and Mazda lamp systems the light which the source gives off is dependent, but not in equal ratio, upon the current which flows. The condensers in all arc-lamp systems must be located at a considerable distance from the source, chiefly because of the intense heat of the arc, and manufacturing considerations limit the sizes of condensers to the point where, as you will note, the angle or zone subtended by the condenser with respect to the arc is small. With direct-current arcs this is not so great a handicap as with alternating-current arcs, for the direct-current arc throws the greater portion of the light it generates forward. The objectives used with arc-lamp equipment are made small in diameter with respect to their focal length in order that irregularities in the arc will not be annoyingly apparent on the screen. There is a possibility of increasing the screen intensity with arc-lamp apparatus by increasing the aperture of the objective lens, but under present conditions such an increase would be likely to be obtained at a sacrifice of steadiness in the illumination of the picture. There seems to be a possibility of increasing the intensity produced by direct-current machines by more careful design of the shutter and possibly by rotating the shutter at higher speeds. It is doubtful if the shutters of alternating-current machines can be much improved, because the cooling of the carbons is so rapid that a stroboscopic effect is likely to be encountered. This effect is, of course, very marked where 25-cycle current must be used.

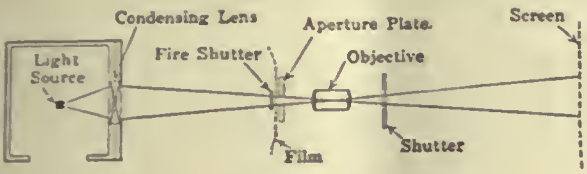


Fig. 2.

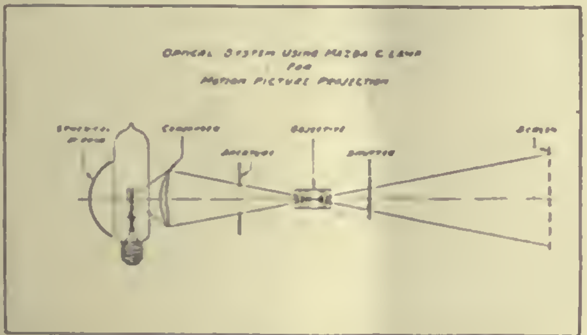


Fig 3.

You will note that with the Mazda lamp system, Fig. 3, a mirror can be used to re-direct into useful directions the light which the lamp gives off in directions away from the condenser. The use of this mirror increases the illumination on the screen by approximately 75 per cent. The lamp is so designed that relatively little light is thrown off to the sides, that is, a relatively large part of the light either strikes the condenser directly or indirectly by reflection from the mirror. The fact that the light-source is confined within a bulb eliminates danger of cracking the condenser, hence a short-focus condenser which subtends a large angle can be utilised. Through the design of a special prismatic condenser the necessity for a thick and heavy lens with accompanying aberration is obviated. The fact that the light-source is absolutely steady and without noticeable flicker, even on 25-cycle current, permits the use of a wide-aperture objective lens with an accompanying good utilisation of light. Shutters can be designed to operate very effectively with Mazda equipment because of the fact that the filament, being heavy, does not get a chance to cool between current reversals. When arc machines are being adapted to the Mazda lamp, it is of advantage to bear the point in mind that the shutter can usually be improved. It is due solely to the better utilisation of light that the Mazda lamp—a source of lower brilliancy, and far less energy consumption than the arc—can be used to project satisfactory motion pictures.

For many years the arc-lamp has been practically the only light-source used in motion-picture projection work, and higher and higher amperages have been employed as the size of theatres has increased, and as competition between theatres has become keener. It appears that a reaction from the very high values may be logically expected, for a brilliant picture loses its attractiveness when discomfort and eye strain from glare are experienced. A bright screen viewed against a dark background produces an effect similar to that produced by a bright street light viewed against its background. In the first case the effect is less marked, and may not be attributed to contrast in brightness, and for this reason is probably more serious than if the trouble were recognised at once and corrected. Flicker and arc travel are also more pronounced at high intensities than at low ones, and we may, therefore, I believe, expect to see the higher intensities gradually abandoned in favour of intensities of the lower order.

J. T. Caldwell.

DEATH OF MR. C. H. HEWITT.

One of the well-known younger figures in photographic circles has been removed by the death on Tuesday last, January 15, at Elstree, Herts, of Mr. C. H. Hewitt, at the age of 45. Mr. Hewitt had been in ill health for two years past and had had to relinquish his position of deputy-principal of the Photographic School at the Regent Street Polytechnic. He nevertheless was actively engaged on photographic literary work up to within a few days of his death. We ourselves received a letter from him as recently as Saturday last thanking us for some slight service we had been able to do him.

Mr. Hewitt's was one of the somewhat unusual careers in which a man brought up as a professional photographer has branched out in the direction of embracing the interests which are commonly the characteristic of the amateur photographer. He was the pupil as a youth of Messrs. H. P. Robinson and Son, and for nine years himself carried on a business of photographic portraiture at Gateshead-on-Tyne. This he relinquished in order to join the staff of the Polytechnic School as chief assistant to Mr. Howard Farmer, a position which he held for a number of years, and in which he achieved a reputation as a pictorial photographic worker chiefly in the bromoil process. Apart from his teaching activities at the Polytechnic he was an indefatigable contributor to the photographic press, for the most part anonymously. This work, after leaving the Polytechnic, he continued to do, with the most heroic disregard of physical obstacles which were the consequence of his illness. His death will be regretted by the photographic community generally and still more particularly by the many students of photography who came under his influence.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Copying Architects' Plans.

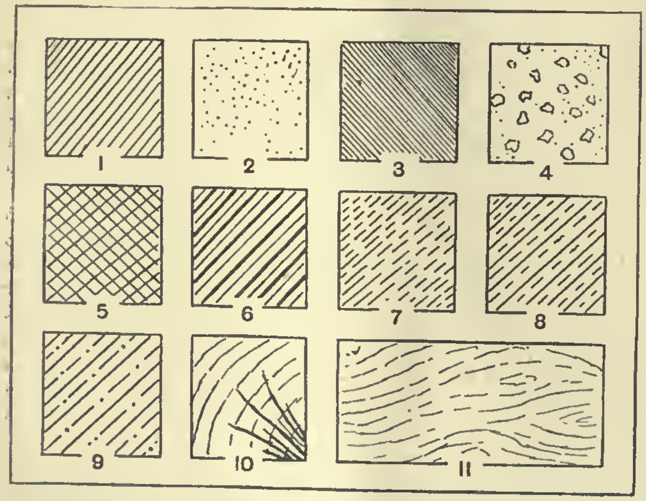
Some time ago a correspondent pointed out in the pages of the "B.J." the large amount of work that may be done for architects and builders in the near future, having in mind the 30,000 houses to be erected under the auspices of the Government as soon as peace is declared. Exteriors and interiors were in the mind of this correspondent, but the happy days of peace, as well as the orders to photograph the new houses, though nearer, seem to be a very long way off.

The opportunity of copying plans for architects is, however, now with us; some of us are busy on the job, while others have made no bid for the work. There are now about 6,000 registered architects in the United Kingdom, and many of them are busy with plans for the new houses that are to come, especially as the Government has instituted a great competition, with handsome prizes for such plans, a contest which closes in a few weeks' time.

It is not my intention to describe in detail the methods of copying plans, but rather to point out two things which may be of assistance to those workers who have a mind to make a bid for the work, or who desire to make a really good job of an order should it come along. In the first place the worker should be well acquainted with blue-print and other processes of a similar character used for plans.

There is another thing the would-be specialist in architectural plan work should know, and this is the architect's usual method of indicating materials on working drawings. It has been the custom to colour some plans, the said colours indicating brickwork, concrete, etc., and obviously such plans are not particularly suitable for the camera or the iron processes. Other architects use hollow squares in which are written the names of the various materials. The Office of Works, I believe, still use the hollow-square system, and colour up when the working drawings are passed for the builder.

Naming and colouring, however, appear to be going—happily for the photographer—out of fashion, and the majority of architects are adopting a kind of "shorthand" which has been imported from America. It is not yet in common use, but it will be, as it does away with colouring, is equally effective, telling the same tale, and easier for the architect, and for reproducing by the camera, or by contact per the blue print or other iron-printing process, artists' black ink being the only "colour" used upon the tracing medium. The accompanying sketch shows the marks used by architects to indicate various materials upon their plans, and a knowledge of them on the part of the photographer may assist him in getting and carrying out the work. The eleven marks are :—1, brickwork; 2, plaster; 3, cast-iron; 4, concrete; 5, lead; 6, wrought-iron; 7, steel; 8, stone; 9, brass; 10, timber, sectional; 11, timber, longitudinal. These, it will be noted, very much simplify the task of the photographer.—P. R. S.



Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Developing Cinematograph Film. No. 111,136 (Nov. 14, 1916).—The film strip (preferably having the usual perforations) is passed through the baths or drying chambers in loops which are weighted at their free ends to take up expansion of the film due to wetting and which (at their ends opposite to the weight) are passed (preferably outside of any bath employed) over rollers having means such as pins at each edge which momentarily engage the perforations.

In order to obtain a long travel in a tank the film may pass from one roller down into a loop up to another roller side by side with the first and on the same shaft and so on to the width of the tank, each loop being suitably weighted.

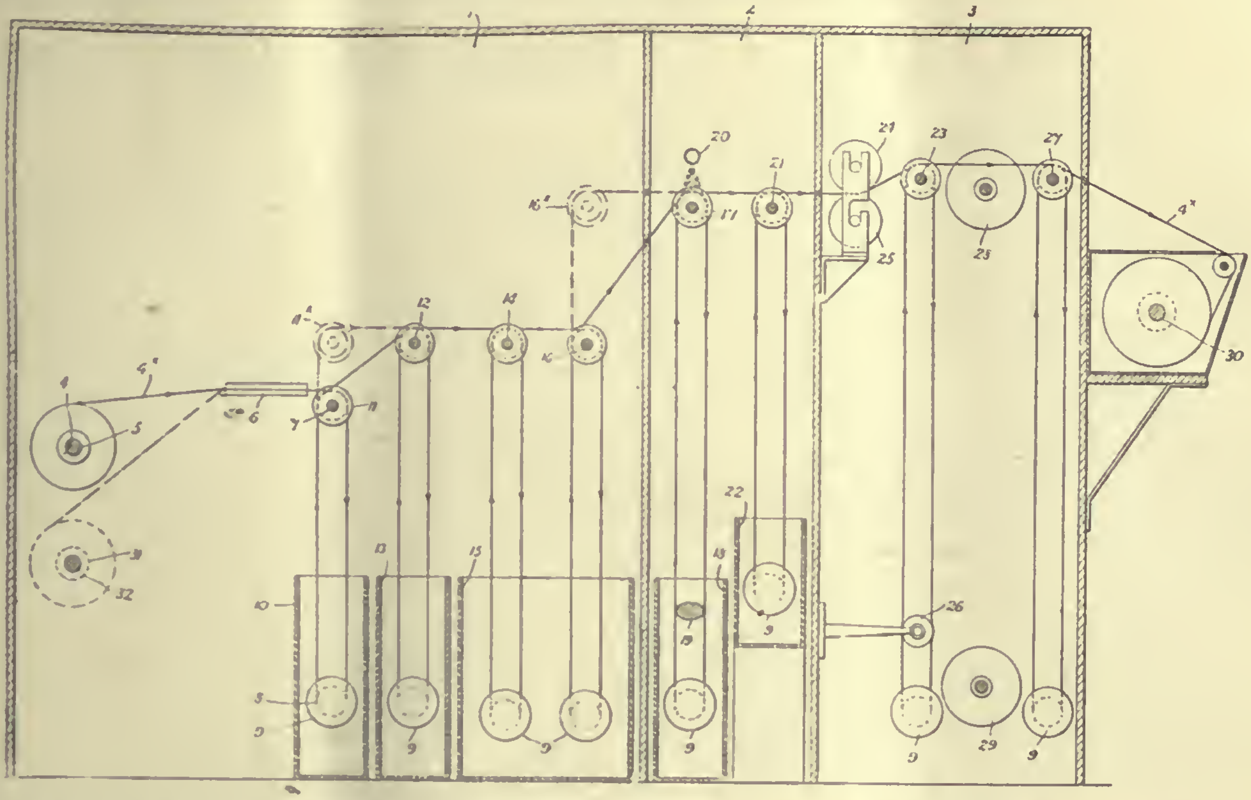
Also where the film leaves one bath to pass to another or leaves one set of rollers to pass to another which it would usually do in a horizontal or perhaps inclined direction, means are provided to take up the slack caused by wetting, such for example as by allowing the weight in the last loop to act for this purpose by employing a plain exit roller for the bath, and a film-holding or pin-toothed roller for the entrance of the next bath, whereby the last weight effects the desired stretch over all the film up to the entrance end of the next bath.

The weight carried by each loop is preferably a roller which can rotate freely as the film travels, such roller having guide flanges to keep it in place. Such weight acts not only to take up expansion when the film is wet but allows for contraction in the drying of the same.

The several parts of the plant (as shown in the drawing), occupying three small rooms—the dark room 1, washing chamber 2, and drying chamber 3—will be described in the order in which the film passes through them.

The spool 4 carrying the exposed undeveloped film 4^x is placed on the spindle 5, the free end is connected to a film already in the machine and is passed through an adjustable gate 6 by means of which the pressure on the film may be regulated. The film passes from the gate around a pin spool mounted on the driven shaft 7 and forms on the underside thereof a loop 8, which is weighted by means of a spool 9, arranged so as to rotate freely as the film travels. Such spool is provided with deep flanges to keep it in place. The film then passes over a plain spool, or if it is desired to have more than one loop in the same bath, over as many more pin spools on the shaft 7 as may be desired, each loop formed being weighted with a spool 9.

The loops 8, with their weights, are immersed in the developing bath 10, and the number of loops or length of film determines the time taken by the film to pass through the developer, assuming that the travel is maintained constant. The film, as it leaves the bath 10, passes up and over a plain spool 11, but in order that the film may pass horizontally to the next series of spools on the shaft 12, the plain spool 11 may be disposed horizontally with respect to the series on the shaft 12, on a supplementary shaft, as shown at 11^x by dotted lines, but this is optional, as the film may pass directly from the plain spool 11 to the first toothed spool on the shaft 12. From the spools on the shaft 12 the film passes in a loop or loops, weighted as before with a spool 9, into a bath 13 for washing the film. From the plain spool on shaft 12 the film passes to the first toothed spool on a shaft 14 from which it hangs in loops, weighted as before, in a fixing bath 15. In order to provide for the complete fixation of the film a second shaft 16 with a further series of spools and loops may be provided, and, from this last series of spools the film passes either directly to the spools on the shaft 17, or as shown by dotted lines over the plain spool 16^x, to the washing chamber 2. The weighted loops from this series of spools are suspended in the washing bath 18. Float-



ing on the surface of the bath and located between the two inner faces of the film, that is, the non-sensitised side, is a bar or roller 19 covered with wash leather or other desired material for cleaning the back of the film, the size of this bar or roller being such that it is caused to rotate by the rubbing action of the film against it. To assist further in the proper washing of the film, a spraying device 20 is provided above the spools on the shaft 17, the water therefrom running down the film.

As it is frequently desired to tone or stain the film, after washing, the film may pass to a further series of spools on a shaft 21 and be arranged to hang in loops, weighted as before, which loops may be immersed in any desired toning or staining bath 22. The film now passes to a further series of spools on a shaft 23, located in the drying chamber 3, and in its passage it may pass between a pair of removable rollers 24, 25, covered with an absorbent material for the purpose of taking up some of the water or other liquid with which the film is charged, such rollers are not however essential. As before the film is caused to hang in loops from the spools on shaft 23, weighted as before. Near the bottom of the loop a dry wash-leather covered roller 26, which may be fixed or caused to rotate in the reverse direction to the travel of the film, is supported in any desired manner between the loops for the purpose of polishing the non-sensitised side of the film. From the spools on shaft 23 the film may pass to a further series of spools on the shaft 27 hanging therefrom in loops as before.

Hot air is drawn into the drying chamber 3 by means of a fan 28 and extracted by a second fan 29.

From the drying chamber the film passes to the spool 30 in a finished condition.

As soon as the film on the spool 4 is run out the free end of a film on a second spool 31, mounted on a spindle 32 arranged directly below the spindle 5 may be connected to the end of the first film and so on, it being advisable, as will be readily understood, always to keep a length of film, preferably a spoilt length, in the machine so as to act as a guide and to save any further handling of any film once the machine has been in operation.—William Cecil Jeapes of 76 and 78, Wardour Street, London, W.

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FORTHCOMING EXHIBITIONS.

February 21 to 23.—Leicester and Leicestershire Photographic Society. Sec., H. C. Cross, 80, Harrow Road, Leicester.

Meetings of Societies.

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MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, January 19.

Rodley and District Photographic Society. Lantern Lecture on Yorkshire.

Monday, January 21.

South London Photographic Society. "Garden Photography" A. D. Fort.
Dewsbury Photographic Society. "Photography and Focus" Prize Slides.
Bradford Photographic Society. "Carbon Printing." J. H. Leighton.

Tuesday, January 22.

Royal Photographic Society. "The Manipulations which go to Successful Picture Making." R. H. Lawton.
Birmingham Photographic Society. "Sea, Lake and Cloud." W. H. Bidlake, M.A.
Hanley Photographic Society, Y.M.C.A. Lancashire and Cheshire Union Portfolio.
Stalybridge Photographic and Scientific Society. "Summer Days with the Birds in the Country." F. Taylor.
Hackney Photographic Society. "Display of Architectural Prints." H. R Heath.

Wednesday, January 23.

Croydon Camera Club. "Satista Printing Paper." W. H. Smith.

Thursday, January 24.

Liverpool Amateur Photographic Association. "Some L.A.P.A. Memories." E. R. Dibdin.
Hull Photographic Society. Comparison of Hand-Coloured Slides of Mr. F. Woollons with Pagets and Autochromes.
Huddersfield Naturalist and Photographic Society. "The Homes and Haunts of Wordsworth." P. Lund.
Stockport Photographic Society. Exhibition of Work by Members.
Sunderland Photographic Association. Affiliation. Lecture.
Hammersmith (Hampshire House) Photographic Society. "After-Work on the Negative and Print." G. C. Weston, M.I.E.E.
Rodley and District Photographic Society. Members' Night.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, January 15. Mr. Olaf Bloch in the chair.

Mr. Cumberland Clarke delivered a lantern lecture on "Shakespeare and the Stage," in which he dealt with the impersonators of Shakesperean characters from the earliest, such as Burbage to those of the present day. He illustrated his passing biographical commentary by portraits and reproductions of stage scenes.

On the proposition of the chairman a vote of thanks was heartily accorded to the lecturer by acclamation.

CROYDON CAMERA CLUB.

MR. A. F. CATHARINE gave a practical demonstration on "Enlarging on Bromide Paper," which proved to be an excellent one from the beginner's point of view, and interesting also to those who had attended similar expositions more times than they cared to remember. He used the club's enlarging lantern, and thus saved himself the trouble of carting his own apparatus along, and the necessity of refusing hot baked potatoes to rude boys in transit. The club lantern is fitted with a Bray "inclined" inverted gas burner, not so well known as its merits deserve; a 9-inch condenser for half-plates, and an objective of the Petzval type. Considering that this type followed the early slow landscape lens working at about $f/12$, it is wonderful how it has maintained its position for portraiture; but, in Mr. Catharine's opinion, and most others, its proper position is not in front of an enlarging lantern for all-round work. Even a quarter-plate in the carrier showed a falling off in definition at the corners; a half-plate would have told a far sadder tale. He used a commercial ruled glass for the test, but Mr. Claypoole reminded members of the old, and, perhaps, better, device of ruling lines with india-ink on a fixed-out dry-plate. The india-ink invariably breaks up, and the minute fissures permit of the finest focussing.

The demonstrator having explained elementary but necessary matters, made three enlargements from three negatives on Wellington's B.B. bromide paper, the exposures being regulated by guesswork. Had he paid for the paper in the ordinary course, doubtless he would have been more careful. Nevertheless, three really fine enlargements of a rich, warm black resulted, which were much admired, for Mr. Catharine is one of a very select few in the club who can make a good combined portrait and picture. Though much slower than the average bromide paper, the B.B. brand appears to be fast enough for most purposes, the three-quarter plates enlarged on to 10 by 8 paper being given about 1½ minutes' exposure.

Generally, he ascertained the correct exposure by trial in the usual way, but strongly recommended Sanger Shepherd's density-meter, provided that the right high-density (in which detail is just to be recorded in the print) was selected. Some discretion was required in the selection, for in the case of a portrait it might well be that if a white collar were taken it might mean an over-exposed print; a little experience soon taught one all that was required in this direction. The figures in the table supplied with the meter, he said, were in all cases given in the nearest whole numbers to any outstanding fractional numbers. Here Mr. Catharine amused himself with the blackboard, and conversation became fairly general. One gathered from the latter that whisky is now being sold 50 per cent. under proof—a criminal proceeding, and from the blackboard that the lecturer had taken the characteristics of the series of numbers, which were in geometrical progression, and had worked out a constant factor of 1.2599 (approx.), conducive to greater accuracy. When this fact had soaked into the 50 per cent. under-proof gentry (mostly of the rule-of-thumb sort), he began to experience a lively time, and ultimately was dislodged from his position by .0001 precisely, it being generally considered that 1.26 was sufficiently accurate for exactitude gone mad.

However, the lecturer revenged himself on "R. C. B.," who, it appears in a recent article in "Photography" on enlarging for beginners, has said as follows:—"It is sufficient to treat the influence on exposure as strictly proportional to the area over which the light is spread. Thus, if on one occasion we make an enlargement twice (linear) the size of the original, and on another we make it three times (linear), the exposure in the two cases, everything else being equal, should vary in the proportion of 4 to 9, since in enlarging twice we have an enlargement of four times the original area, and in enlarging three times we have one nine times the original area." With his enlarger, Mr. Catharine had found the ratio to be 4 to 7, which he considered too big a difference to be ignored for the sake of simplification. To one accustomed to think in several places of decimals such a discrepancy must be very painful, and R. C. B. is respectfully requested to be more careful in future, even if beginners have to be sacrificed in consequence. That he is familiar with the point at issue, of course, goes without saying. This is merely mentioned to avoid any possible inference arising to the contrary, which obviously would be an unwarranted suggestion.

Commercial & Legal Intelligence.

LEGAL NOTICES.—Notice is given that the names of the undermentioned companies have been struck off the Register of Joint Stock Companies, and are dissolved:—County Photographic Co., Limited; Fac-Simile Art Co., Limited; Magnet Photographic Paper Co., Limited; Photo Art Co., Limited; Summit Colour Engraving Co., Limited; Colour Photography (Foreign Patents), Limited; English Fine Art Co., Limited; Lewis Photographic Printers, Limited.

WHAT IS "THE WHOLE OF A BASEMENT"?—At the Bath County Court last week, before his Honour Judge Gwynne James, an action was heard arising out of a dispute between landlord and tenants. The plaintiffs were Misses Chivers and Joll, photographers, and the defendant Mr. T. J. Head, dental practitioner, both of Seymour Street. The ladies, who rent premises from Mr. Head, and adjoining those occupied by him, claimed the exclusive use of all the cellars in the house, and asked for an injunction to restrain the defendant from using any of the same. £5 damages were claimed.

Mr. F. R. Weatherly appeared for the plaintiffs, and Mr. A. Myddelton Wilshere represented the defendant.

Mr. Weatherly explained that opposite the Midland Station two houses, both owned by the defendant, adjoined; one he occupied himself and the other was formerly occupied by Mr. Lewis, a well-known photographer, who had to close his business owing to the war. Consequently the latter was vacant for some time. Miss Kathleen Chivers, who had been for many years in the photographic business as an assistant in London and Bedford, entered into a partnership with Miss Marion Joll, of Bristol, to start in business together in some town where a suitable place could be found. The premises in question attracted them, inasmuch as the landlord's wife was Miss Joll's sister, and they were previously used for the express purpose for which they required them. They eventually agreed to take the same. Not merely on the terms of the agreement, but in fact, they were to have the whole of the basement, and their exclusive rights began from the top of the stone stairs. Now, Mr. Head had let the higher floors to two tenants, Mrs. Matthews and Mr. Curtis, and in order to get himself out of a mess he was intruding on the plaintiffs' basement by depriving them of two of the cellars to enable Mrs. Matthews and Mr. Curtis to store their coal. One of these was used by Mr. Lewis specially for enlarging, and the plaintiffs could hardly have balanced their camera on Mrs Matthews' coal, not to mention the dust. (Laughter.)

The Judge said the question appeared to be what was the meaning of the term "the whole of the basement."

Quite a volume of correspondence was read, and Mr. Wilshere remarked that there had been a great deal of friction between the parties.

The Judge at this stage suggested a visit of inspection. Before he left to do so, accompanied by counsel, Mr. Wilshere remarked that defendant was perfectly willing to make any reasonable arrangement.

On their return, Miss Chivers said that defendant told Miss Joll and herself that Mr. Lewis used the whole of the basement for the photographic business, which was an inducement to them to rent the premises. Consequently, on being deprived of the two cellars, plaintiffs had had to pay for the use nearly every week-end of a dark room at Bristol for enlarging. Defendant's attitude was that the premises were his and he could do what he liked with them.

After Miss Joll's evidence the defendant went into the box. He said this was the first time he had ever heard the plaintiffs required the cellar for enlarging. He would have been willing to allow them to have it then and now. In speaking of the basement he never included the two cellars in his meaning. He added that on the arrival of Mrs. Matthews he asked Miss Chivers which cellar she wanted. He proposed to let each tenant have a cellar.

Other evidence was given by Mr. Arthur A. Gooding, of Gooding Bros., who considered the cellars were not part of the basement, by Mrs. Matthews, and by Mr. Curtis.

The Judge, in giving judgment for the plaintiffs, said it was clear the whole of the basement meant and included the cellars. He was not satisfied that leave and license was given to the tenants to use the cellars. The plaintiffs succeeded because there had been trespass, but the claim, like the agreement, was not altogether explicit. Because the plaintiffs' claim was in reference to one cellar only and not that used for enlarging, the damages allowed would be technical damages only, viz., 1s. He refused an injunction, because he thought it was unnecessary He hoped Mr. Head would not prevent anyone using the cellars in future. On the question of costs, he gave them against the defendant on Scale B. "Let there be no more fuss," added his Honour.

NEW COMPANIES.

Farquhar Vitrified Photograph Co., Limited.—This private company was registered on January 5 with a capital of £25,000, in £10 shares, to acquire from Louis Crabtree and R. F. Gribbon the benefit of a secret process for the production of vitrified photographs, to acquire the benefit of an option to purchase certain freehold premises at East Sheen, known as the "Derby Lodge Estate," to work the said process with a view to the production of vitrified or ceramic photographs on china, glass, opal, and similar vitreous substances, etc., to manufacture and deal in ceramic colours used in the manufacture of tissues and the like, etc. The subscribers (each with one share) are:—L. Crabtree, Holmhurst, Temple Sheen, S.W., traveller; R. F. Gribbon, 4, Deanhill Road, East Sheen, S.W., wine and spirit merchant The first directors are L. Crabtree and R. F. Gribbon (both permanent). Solicitors, Coupland and Ward, 1, Palewell Villas, Upper Richmond Road, East Sheen, S.W.

News and Notes.

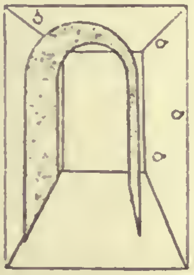
Photographic Record of Nottingham.—With the object of obtaining a photographic survey, as near as practicable, for the Nottingham Public Libraries, Mr. Walter Briscoe, the librarian, is asking for gifts of photographs of streets, buildings, and objects of interest in the city. Many people have photographs of bits of old Nottingham and of present-day Nottingham which will some day be "bygone Nottingham." This collection, from the local topographical standpoint, will in due course be of great value as well as interest, and will form an important addition to the local colection in the Central Reference Library.

Any of our readers who are able to respond to this request are specially asked to write the description of the photograph and the year of taking, on the back of the picture, so that these may be properly classified and kept in chronological order. Givers of photographs are asked to enclose their names and addresses, so that their gifts may be acknowledged with thanks.

Stripping Gelatine Plates.—A correspondent, L. Van Dyk, of the "Inland Printer," contributes to the "Process Engraving" department of that journal the following notes on stripping and transferring films from gelatine negatives, however old:—

"Varnished negatives were soaked in denatured alcohol or methylated spirit until it dissolved away. I do not use hydrofluoric acid now, as I found fluoride of sodium to be so much cheaper, and it does not go for the surface of the glass or your fingers as the hydrofluoric does. I flow all dry plates first with the photo-engravers' stripping collodion and let it dry. Then I cut with a sharp knife point through the film all around and near the edge of the glass. I next pour enough formaldehyde solution (formaline) in a rubber tray to cover the negative and dissolve in it ten grains of fluoride of sodium for every ounce of formaline I use The dry-plate negative is then put to soak in this formaline solution for a few minutes, or until the corners of the negative lift easily with a penknife. Squeegee on the negative a sheet of paraffin paper that has been laid in the solution over the negative for a short time. Then with the point of the penknife I loosen the film carefully as I turn back the paraffin paper to which the film is attached. Wet another sheet of the paraffin paper and lay the stripped film down on that so as to make a sandwich with the film in the centre. Strip off the first sheet of paper and then lay the film down on a clean sheet of albumenized glass, strip off the second paraffin paper after squeegeeing the film very carefully to the new glass support, rinse off with alcohol, and the job is done."

Half-Watt Studio Lamps.—Our French contemporary the "Photo-Revue," in reprinting the recent article by "Practicus" on the installation of half-watt lamps for studio portraiture, adds a brief description of the system employed by an Italian photographer, Signor Rossi, the results of which, so it is stated, are in every way equal in quality to those made under the best conditions of daylight. It will be seen that M. Rossi's plan is actually a studio within a studio, and is thus particularly applicable to studios of exceptionally large size, in which the reflecting action of the walls, in the way of providing a considerable volume of diffused light, is very much smaller than it is in studios of lesser dimensions. M. Rossi constructs a wooden erection covered with muslin of the form shown in the sketch. Its dimensions are about 13 ft. in height, 10 ft. in depth, and 3 ft. in width. The studio in which this erection is placed is some 16 ft. in height, 15 ft. in width, and 22 ft. in length. Three half-watt lamps, each of 1,000 c.p., are placed on one side of it, and are designed to form the principal source of diffused light. A fourth, of 3,000 c.p., is disposed on the other side, and provides the principal illumination of the sitter. Each lamp is controlled by a switch so that the lighting may be regulated at will, and the erection itself is provided with blinds for the further control of the illumination. It is stated that exposures with an f/4.5 anastigmat and an extra rapid plate are of the order of 1 second.



Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply; 6-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

Photographer, Southampton.—For R.N.A.S. apply Office Commanding, Photo-Section, 45, Victoria Road, Chingford. For R.F.C., Officer Commanding, Photo-Section, R.F.C., Farnborough, Hants.

B. H.—Dampness of the paper is quite enough to account for the lesser degree of brilliancy; in fact, for a good deal more than that shown by the flatter specimen. At the same time, we think it is quite likely that differences in the emulsion might easily be the cause.

W. R.—There is no reason why you should not supply your customer with a copy, that is to say, such an ordinary copy as you would make in the ordinary course. It would be a different matter if you attempted so to copy the form as to make the copy of such a character that it could be palmed off as an actual exemption form.

T. E.—We do not know what you should do, but you can certainly repudiate the contention of the builder as utterly ridiculous that the "chemical stuff" which comes from photographers' sinks is anything which by its nature causes a stoppage in drains. If it is alleged that such stoppage has been caused by matter from your premises, we should say it is the business of the builder who makes such a positive statement to prove, by producing the material of the obstruction, that it has come from your place.

M. B.—It is difficult to see how the projection lens can become dewed by the heat of the lamp chamber. But obviously the remedy is to keep the projection lens well ventilated. Judging by your sketch your plan would be to have the bellows fixed to a separate support a little behind the lens front so that there is a clear air space all round the lens. If necessary, a further casing an inch or two away all round may be put in position to cut off any light, but at the same time to allow ample circulation of air.

A. E. B.—Under present copyright law, that of the Act of 1911, it is not necessary to do anything at all in order to obtain copyright in photographs. The very fact of taking the photograph creates the copyright in it. In the ordinary course where an amateur photographer takes such a photograph for his own purposes, i.e., "on his own," the copyright belongs to him. Where a photograph is taken to the order of anyone else who is liable for payment for the photographic work, then the copyright is the property of the person giving the order.

ARTIFICIAL LIGHT.—I propose using a Marion Northlight lamp for portraiture. Mostly for small groups and single figures. How many pair of carbons would you recommend? I am using a 3D Dallmeyer lens at the full aperture of F. 6. I presume this would not be quick enough for electric work. Would you prefer an anastigmat such as the Ross Xpres F. 4.5, or a Dallmeyer 3B, or similar lens of the same aperture?—ELECTRIC.

The four-pair Northlight lamp is the most economical, as each of the two pairs is connected in series, thus utilising nearly all the current consumed. With such a lamp your exposures would not be more than in fair daylight, but if you have many children's pictures to make you would find it advantageous to procure one of the more rapid lenses you mention.

H. J. L.—As you do not tell us what is the aperture of the projection lens on the lantern—which is the chief thing determining exposure—it is possible for us only to guess at the cause of the long exposure. It is altogether too long; if the negative is of decently quick-printing quality, exposure on bromide paper should be only 5 or 10 seconds. We should say the great length is due either to a poor incandescent burner or a lens of small aperture or unsuitable focal length. Under your conditions the lens should be of 8 or 9 inches focal length, and at least of $f/6$ aperture. The incandescent burner may be one of the cheap upright patterns. For enlarging there is no better gaslight than the "Howellite" inverted burner, obtainable from Messrs. Griffin, Kingsway, giving an exceedingly strong and concentrated light.

ENLARGING LENS.—Will you please state if an anastigmat lens should give a sharp image at full aperture on the enlarging easel? I have an Aldis ¼-pl. 5¾-in. F. 4.5, also a Cooke 8-in. F. 4.5 Series III. Both require stopping down to obtain even definition on the enlarging easel—the Aldis more so than the Cooke, although both lenses give a flat field at full aperture when used in the camera.—FREDERICK SMITH.

You do not say what size negative you are enlarging from, but either lens should give a good result with a quarter-plate negative if all conditions are favourable. The definition is affected to some extent by the illumination, and possibly this is not in perfect adjustment; while, also, the scale of enlargement may affect the flatness of field. Ordinary lenses, not specially designed for enlarging, are corrected for conditions which are only fulfilled when enlarging on a considerable scale, and when used for copying full-size or for enlarging on a scale of, say, two or three times, may not give such good results.

MONOMET DEVELOPER.—Can you, please, give me any advice to prevent Monomet hydroquinone developer becoming stained? I have made up two lots exactly to quantities given in the "B.J." of August 24, p. 442 (Henry Holman's formula), but dissolving as suggested by A. W. H., of the same issue. It works well, but the last half-pint has on each occasion gone muddy before I have wanted to use it (about six weeks). I may say I use water that has boiled thoroughly for the whole solution. Would extra sulphite, or, say, boiling the whole solution after making improve its preservative qualities?—A. T. C.

If the water has been boiled briskly for five minutes shortly before using it for dissolving the chemicals, there will be no benefit in further boiling the mixture after chemicals have been dissolved. You might try the result of using rather more sulphite, say, 1 or 1¼ ounces; but we think the best plan would be to bottle off the solution when made into a sufficient number of pint bottles to hold the lot, filling each to the cork. We should say if you do this that you would be able to use the whole bulk of stock solution which you make at a time.

F. S. H.—So far as we know, there is no useful method of recovering developers or used developing solutions, nor from hypo baths. We do not think for a moment that it is possible to recover anything from used developers at a cost which would make it worth while. Hydroquinone has been recovered from spent hydroquinone developer by bubbling a current of sulphur dioxide gas through the boiling solution of the spent developer. A Mr. Lizius gave a demonstration of this process at the Royal Photographic Society on February 22 last year, but his process was not generally accepted in respect to any claims to economy. And on economic grounds there is no opportunity for recovering hypo from spent fixing baths. Obviously, when you use the hypo as completely as possible for the conversion of the silver bromide into a soluble form there is no great excess of unaltered hypo left in the bath. At any rate, we know of no chemical method by which such unaltered hypo could be again obtained in a form in which it may be used for fixing. Our own opinion is that the chief form of economy you can practise is to organise fixing baths so that those which have been used for prints can be subsequently used for plates, when it can be seen (owing to the glass support) when they are approaching a degree of exhaustion. Of course, you can recover silver from the baths, and that is the chief direction in which you can reclaim material from the solutions used in photographic work.

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HENRY GREENWOOD & CO., LTD., Proprietors and Publishers, 24, Wellington Street, London, W.C. 2.

IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as "returns" are no longer accepted by the publishers. This step has become necessary owing to the further restrictions imposed by the Government on the importation of paper and paper-making materials and of the consequent shortage of supplies. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

THE BRITISH

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The Summary of contents which usually occupies the lower half of this column will be found at the foot of the page overleaf and will continue to be placed there whilst its regular position is required for notices relating to the forthcoming "B.J. Almanac."

Where to Get the Almanac.

At the time of writing—two weeks before the Almanac should be on sale—the orders already received by our publishers total more than 15,000 copies printed. In other words, the publishers are unable to accept further orders.

It was to be feared that the supply of the 1918 Almanac would not equal the demand for it even at the increased prices of 1s. 6d. and 2s. 6d. Even with the circumstances of both amateur and professional photographers so exceptional as they are at the present time, and even after allowance for the numbers of its customary readers who are for the time intent on other things than photography, it was anticipated that the edition of 15,000 would not satisfy all comers.

So it has proved, and therefore with our first announcement of the fact should come an intimation to those who have not yet ensured delivery to them of an Almanac, and still wish to do so, that they must not look to the publishers if unable to purchase locally.

As soon as we possibly can we will announce the day of publication of the Almanac, which day, within the limitations of present railway transport facilities, we shall endeavour to make the same throughout the United Kingdom. The reader should thus learn when he may expect to buy from his local dealer or bookseller, but unless he has previously ordered a copy to be reserved it is very doubtful if he can now expect to secure one. Distributors this year were at first inclined to order on a very greatly reduced scale; only when they had evidence of the widespread individual demand were their orders augmented to figures which have led to a total in excess of the edition.

EX CATHEDRA.

Economy and Waste. Times like the present bring matters of economy and waste into great prominence, and many things occur that serve to remind us that few people realise the difference. The facts that economy may be wasteful and waste may be economical seem to be unknown to many people. For example, some seem to think that throwing a used developer or an exhausted fixing bath down the sink is necessarily waste. A developer, or at least some developers, may it is true be restored to working conditions, but it is not necessarily economical to attempt the task, even in these times. It cannot be done without expense, and the final profit minus this expense may be considerably less than the value of the photographic work which might have been done in the same time. This will certainly be so in the case of a developer, and often will be so in the case of a fixer, for though it is easy enough to recover the silver from the latter it will not be worth while unless there is a lot of it, for it will take nearly as much time and trouble to treat a gallon of fixer as it will to deal with a hogshead full. The man who is only a very small user of hypo will gain nothing by attempting to recover the silver, though one using large quantities may gain a good deal. The attempt, however, to recover the hypo, which has been suggested, is one that will pay neither the small man nor the big one, for it is much on a par with the effort to restore a used developer. The photographer's business is to make a profit out of photography, not out of chemistry, and some of the suggested restorative processes could hardly be made profitable at all, even by a skilled chemist working on a big scale. It is not waste to throw away a used and useless thing while it is waste to save rubbish, or, as some people say, "economise it." It may even be wasteful to economise on a useful thing. Hypo is now short, but if a hypo bath is thrown away when it should be it will still contain a lot of unexhausted material. It may seem economical to use it as long as it will work, but in that case prints may suffer, and the saving of the useful hypo may be more than balanced by a waste of prints, and loss of repute and custom.

* * *

Cleaning-up Prints. It frequently happens that photographers receive prints for copying or framing which are in a more or less dirty condition, and require some treatment to remove, at all events, a portion of the surface dirt. Some caution is necessary in setting about this work, for what would improve one kind of print would ruin another. Platinotypes are most difficult to deal with unless they can be unmounted and put through an acid bath, but much can be done by dabbing with a little stiff dough made by kneading wheaten flour with water until it is of an elastic consistency and does not stick to the fingers. Failing this, fine dry breadcrumbs will pick up a great deal of the dirt, but care must be taken not to rub too hard, or some of the platinum may be removed from the more delicate half-tones of the image. Rubber or eraser should not be used, nor should the surface be wetted. Carbons are easily cleaned; as a rule a pad of cotton wool damped with benzole or motor spirit will remove all surface dirt, but will not move any working-up. The same method answers well with bromide or P.O.P., but with these soft rubber may be used, or even fine pumice powder applied with the finger tip and gently rubbed in a circular direction. A rub of encaustic paste or white wax dissolved in turpentine will often do wonders in removing the tarry deposit from London smoke. Old albumen prints, of which the surface is usually cracked, are difficult to clean, as any liquid tends to wash the dirt into the cracks and make matters worse. The dough treatment is the best for these, as it lifts the dirt from the cracks as well as the surface. Prints finished in water-colour may be dusted only with a soft handkerchief, and rubbed with nearly dry crumbs. If there is any sign of the colour shifting, further rubbing is dangerous. White margins may be cleaned with soft rubber; the green variety is the best for this purpose.

* * *

The Family Album. There have been many attempts to revive the portrait album, but we do not believe that individual photographers have done as much as they might have done in this direction. The old decorated volume is without question as dead as Queen Anne, but there is still an excellent opportunity to introduce a more up-to-date article if photographers, and their receptionists, would take a little interest in pushing it. The family ties in these days of stress are stronger than they have been for many years, and many of the photographer's customers would gladly purchase any convenient appliance for preserving the portraits of those who have given their lives to their country, together with those who are still carrying on. The idea should appeal to the photographer, because every time an album is inspected it suggests to someone the desirability of visiting a studio, or of acquiring such collections of his own family or friends. The modern methods of mounting fit in well with the album idea. There are now on the market many good patterns of loose-leaf album in artistic shades of card, and it is a simple matter to dry-mount with or without border tints any specially made prints. Existing prints can have the mounts attached to the leaves by a few touches of seccotine. Damaged or faded prints may be copied and worked up so as to be uniform in appearance with later work. We are sure that in any business with a "family" connection a sample album got up on these lines would be a good order-bringer. A great point about the album is that gaps in the collection are always in evidence, and the defaulters get a gentle reminder that they haven't had their portrait taken yet.

* * *

The Need for a Slogan. The advertising expert of to-day calls any catch phrase used by a business concern a "slogan," a Gaelic word meaning a war-cry. Such phrases as "Worth a guinea a box," and that one known to all photographers, "You press the button, we do the rest," are excellent examples; and have helped to fix the name or goods of their originators in the memory of millions. Every photographer needs a slogan, indicative of what he considers best in his work or methods, and which he will strain every nerve to work up to. "Portraits when Promised" makes a good slogan, and will help to decide the venue of an order when promptness is a desideratum. "Permanent Pictures Our Pride" is another good selling phrase, and there are scores of others which are best framed by the user, who is the best judge of what will best suit his business. It must never be forgotten that the slogan is not only a challenge but a pledge. It must be backed up by performance, and it must, when connected with photography, be uttered in a cultured tone. Mere self-laudation is useless. "Gummidge's Portraits are the Best" is worthless as a slogan, for it is a mere *ex parte* claim, with no explanation as to why they are superior to any others. The public has had enough of that kind of talk, and takes it at its true value.

* * *

The Sink Waste. A correspondent recently mentioned the contention of a builder that he had blocked the drains with "chemical stuff." It is difficult to block any reasonable "drain" with the material put down a photographer's sink, but it is extremely easy to block the waste pipe leading from the sink to the drain, and we have known several instances in which carelessness has led to such a result. People are apt to think that almost anything is capable of passing down a sink pipe, and, instead of using the waste only for liquids, permit such things as cotton wool, gelatine, corks, etc., to fall into the sink and expect them to get out again somehow. Cotton wool is used largely in some dark-rooms, and old pledgets are dropped quite as a matter of course into the sink. They may or may not block the pipe, but if they do they are capable of giving a lot of trouble. Washed off paper labels and old corks will at

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SUMMARY.

In a leading article we deal with the reciprocal relations which, by official consent on both sides, exist between this country and the United States in regard to copyright. The essential basis of the arrangement is that British photographs in America secure copyright protection of a kind and under the conditions which apply in that country, whilst the converse holds good here in reference to photographs made in the United States by American citizens. It follows from this that in order for British photographers to obtain copyright protection for their work in the United States it is necessary to comply with the American formalities in the way of registration and deposit of copies at Washington, and, in the case of photographs which are "published," marking them "copyright." (P. 39.)

Mr. D. Charles contributes some notes on gaslight printing from amateurs' negatives, in which he describes methods and home-made appliances which can be used for expeditious work upon a scale which may not justify the equipment which is used by large trade firms. (P. 42.)

In a contributed article Mr. Graham M. Nicol has something to say on behalf of the older type of (R.R.) lens in comparison with the modern anastigmat. The lesser covering power of the R.R. lens and the consequent lesser amount of stray light in the camera are the grounds on which he recommends the greater utilisation of the many second-hand lenses of the R.R. type which are available. (P. 41.)

Although the old-fashioned portrait album is thoroughly and deservedly obsolete, there still seems to be an occasion for providing some form of album which, in accordance with present-day tastes, might be used for the assemblage of family portraits. (P. 38.)

In reference to the making of negatives (for sketch portraits) with dense deposit for the background, a correspondent points out reflection within the lens from the white vignetting card in front as a cause of negatives which print grey in the ground. (P. 47.)

Methods which can be used for the renovation of prints in the way of removal of mechanical dirt are the subject of a paragraph on P. 37.

Cleaning arc-lamp glasses, vignettes in strip-printing, tank development, finding *f/* number, illumination in enlarging, and the use of the Dallmeyer portrait lens are among the subjects briefly dealt with in replies to correspondents. (P. 47.)

times form most effective plugs. More substantial material, such as paper or cotton wool, can be stopped by a grating at the outlet, and such a grating should always be provided. We know of one case in which a pipe was plugged by a bottle brush which was dropped accidentally into the sink, and vanished down the open waste before it could be rescued. This kind of thing can readily happen, and a suitable grating is the only safeguard. Another source of trouble is not a stoppage but a leakage, caused by pouring away strong acids. None but very dilute acid should ever be allowed down the sink.

COPYRIGHT IN BRITISH PHOTOGRAPHS IN THE UNITED STATES: AND IN AMERICAN PHOTOGRAPHS IN GREAT BRITAIN.

The closer relations which in the future must inevitably exist, in a hundred ways, between this country and the United States make it of some importance that the facts concerning copyright of photographs in the respective countries should be mutually understood. It can readily be imagined that with the more active share taken in the war by the American Republic and from the presence in these islands and on the Continent of Europe of thousands of American citizens engaged in the prosecution of the common aims of the Allies, there will necessarily come into existence large numbers of photographs which have as great an interest for the American public as for ours; and, on the other hand, photographs produced in the United States will likewise possess, many of them, an interest for people here on account of their connection with military and other operations in Europe. In these circumstances it is only fair that the rights of photographers in respect to the reproduction of their photographs should be observed in either country—those of American citizens here; those of British subjects in the United States. Such an observance obviously can only come from an understanding of the technical conditions as regards legal copyright protection which prevail in the respective countries. It may, therefore, be of interest to our readers, both here and in America, if we briefly outline what these conditions are.

Until the year 1909 the United States, in the matter of reciprocal agreement as to copyright protection, held almost entirely aloof from the arrangements entered into by other great nations. Until this time the only basis for reciprocal concessions of copyright was that provided by the Chace Act of 1891. Originally it applied only to books, and granted copyright to authors who were neither citizens of nor residents in the United States provided that the books were printed from type set within the Republic. By modifications of this Act of 1897 and 1905 its scope was somewhat extended, but, in regard to photographs, its provisions never attained any degree of definiteness. Then, in the year 1909, the United States Government set its house in order in respect to copyright law by drafting and passing an Act of wide scope, embracing all descriptions of work, literary, musical, dramatic, artistic, and photographic. In the present connection it is Sect. 8 of this Act which is of interest, in that it defines the basis of mutual copyright protection between the United States and other countries. Divested of a few superfluous words, Sect. 8 of the U.S. 1909 Copyright Act is as follows:—

> The author or proprietor of any work made the subject of copyright by this Act shall have copyright for such work under the conditions and for the terms specified in this Act: provided, however, that the copyright secured by this Act shall extend to the work of an author or proprietor who is a citizen or subject of a foreign State or nation, only:—
>
> (a) When an alien author or proprietor shall be domiciled within the United States at the time of the first publication of his work; or
>
> (b) When the foreign State or nation of which such author or proprietor is a citizen or subject grants to citizens of the United States the benefit of copyright on substantially the same basis as to its own citizens, or copyright protection substantially equal to the protection secured by such foreign author under this Act or by treaty.

Such reciprocal arrangement referred to in Sub-Section (*b*) of the above was entered into between Great Britain and the United States in July, 1909, by proclamation of the President. The proclamation declares that Great Britain "has permitted to citizens of the United States the benefit of copyright on substantially the same basis" as to its own subjects.

In other words, if you, a British subject, are living in the United States at the time of the first publication of your work (photograph)—which is a different thing, by the way, from the time of its production or creation—you secure copyright according to the U.S. 1909 Act as though you were a citizen of the United States. This provision will interest few photographers here for the twofold reason that few of them are concerned in rights in photographs published during their (the photographers') residence in the United States, and equally few are concerned in copyright photographs which are "published" within the ordinary meaning of that word, that is to say placed on sale so that anyone can freely purchase them. It is the second provision (*b*) which chiefly provides the basis for the mutual copyright concessions between this country and America. Taken in conjunction with the Presidential proclamation sub-section (*b*) amounts to this: We in this country have granted to citizens of the United States the benefit of copyright on terms such as we enjoy; the United States grants protection to us in America on terms such as *they* enjoy. At the time this relation was entered into copyright in photographs in this country was regulated by the now repealed Act of 1864, but so far as our knowledge goes there is no ground for believing that the British-American relation is disturbed by the revision of our copyright law in the Act of 1911, which in some respects, *e.g.*, the comprehensiveness of its scope, is much more closely in correspondence with American legislation than were the previous Acts which in this country regulated copyright.

Thus, as a first consequence of a study of the terms of this reciprocity arrangement, it is seen that subjects or citizens of countries other than the United States obtain copyright for their photographs in the American Republic in accordance with the conditions set forth in the 1909 U.S. Copyright Act. Inasmuch as the conditions provided by this Act differ radically in respect to some items from those which are now the law of the land in this country, it is necessary that photographers here should recognise the differences in order that they may comply with the necessary American formalities. So far as our reading goes, we understand that the basis of reciprocal copyright between this country and America is different from that fixed by international agreement among countries subscribing to the Berne Copyright Union, according to which members of each country observe the formalities of their own country and obtain the privileges granted respectively in the other countries. The wording of the U.S. Act, however, if it is not precisely emphatic on the point, can be interpreted only in the sense that we here must comply with the formalities in the United States and obtain the benefits granted under the American Act, whilst American photographers, on the other hand, obtain our benefits here without the observance of any formalities simply for the reason that under the 1911 Act there are not any.

But to come now to the procedure which is necessary in the United States in order legally to secure and maintain copyright. In the first place it is necessary to register all photographs with the Copyright Office at Washington. The necessary forms for registration are obtainable from the Copyright Office, Washington. That for photographs published for sale is J1; that for photographs not reproduced for sale is J2. On these forms the name and address of the applicant must be stated, the nationality (citizenship; not race) of the author of the work; title of work, and, in the case of all *published* works, the actual date of publication. The fee for the registration of the photograph is fifty cents when no certificate of registration is desired. It is also necessary to deposit one copy of the photograph, which must be a real photograph, not a photo-mechanical reproduction. This deposition of one copy applies to photographs which at the time of registration have not been published; *i.e.*, reproduced for sale or publicly distributed. If, and when, a photograph is published a further copy of it requires to be "promptly" deposited at Washington. The word "promptly" has been defined as "without unnecessary delay," but it is officially stated that the deposit need not be made on the very day of publication. The publication referred to in these instructions for the registration of copyright claims signifies publication simultaneously in the United States and in the foreign country, *e.g.*, the United Kingdom. This publication determines the period for which copyright in the U.S. lasts, viz., twenty-eight years from the date of first publication.

A further regulation of the U.S. Act is that works for which copyright is claimed require to be marked "copyright" when published. In the case of photographs this marking may consist of the letter C enclosed within a circle, thus ©, accompanied by the initials, monogram, mark, or symbol of the copyright proprietor. In such cases the name itself of the copyright proprietor must appear on some accessible portion of the photograph or on the mount. These two provisions, that of registration and of marking published copies, constitute the two formalities which come within the regulations of the American Act. The first is familiar to most photographers, inasmuch as it was a feature of the legislation in this country previous to the 1911 Act; the second has never been ordered in this country in reference to photographs. As regards the privileges in America, photographs broadly rank with other artistic works, except that they are placed in a subordinate class compared with works of art as regards the damages which are recoverable in the case of infringement by reproduction in a newspaper. Such damages shall not exceed two hundred dollars (£40), nor be less than fifty dollars (£10).

And now to our American friends. Under the reciprocity arrangement they are more fortunately placed as regards protection of their works in this country than are their British brethren as regards protection of *their* photographs in the United States. The difference arises from the broad basis of the copyright legislation in this country, which is embodied in the Act of 1911. By this Act the previous formality of registration was swept away. The simple act of taking a photograph creates the legal right in it, and no formalities of any kind are necessary as a preliminary to taking action against anyone who may have infringed a photographer's copyright. As we interpret the reciprocity arrangement—and it is the interpretation which is laid upon it by eminent writers in this country on the law of copyright—a photograph taken in America by a citizen of the United States which comes into this country obtains just the same measure of protection as if it were made in Great Britain by a British subject. We conceive that it is not necessary that an American citizen, in order to obtain rights in his work in Great Britain, should register his photographs at Washington, as he requires to do in order to make good his claim to copyright within the United States. Such an interpretation is the logical conclusion from the terms of the reciprocity arrangements between the two countries, whereby an American citizen secures for his work in this country exactly the same rights which a British subject secures in exchange for rights to a British subject in the United States such as an American citizen there obtains. The fact that those rights in America are conditional on fulfilling certain formalities, while in this country they are not, is a fortunate circumstance for American photographers, the real commercial value of which they no doubt fully appreciate. There are many other minor issues connected with the law of photographic copyright in this country which thus become of as much interest to American photographers whose work may be reproduced here as they are to those in these islands. It would be a repetition of much that we have previously written in these pages if we endeavoured further to dwell upon them for the information of our American friends. We may perhaps be allowed to say that the whole story lies ready to their easy reading in the manual "Photographic Copyright," which we published from this office a year or two ago, and which our publishers can supply at a price inclusive of postage to America of one shilling and one penny (twenty-six cents).

HAMMERSMITH HAMPSHIRE HOUSE. The annual exhibition has been arranged for April 18, and the following month. The judge this year will be F. J. Mortimer, F.R.P.S. The open class will be divided into two sections: (1) prints, (2) slides and transparencies. Medals and certificates will be awarded. Final date for reception of works, March 19. Full particulars and prospectuses may be obtained from either of the joint secretaries:—H. T. Callender, 10, Acre Lane, Brixton, S.W.2; W. T. W. Spiers, 201, Goldhawk Road, W.12. The co-operation of all pictorial photographers is earnestly invited.

TRIBUNAL APPEALS.—At Plymouth last week Sydney Joseph Berry, 4, High Street, Crediton, photographer and hairdresser, was given exemption by the local tribunal, and the military appealed. Captain Stirling said photographers were wanted in the Army. The chairman said the tribunal would like to be assured that when they sent a man into the Army to do definite work that work was given him to do. In one case where the tribunal had sent a man into the Army because men of his calling were wanted it was discovered that he was employed picking up paper. Captain Stirling replied that the posting officer had definite instructions on the subject. All he could say was that the list was supplied him every month of the trades in which men were wanted in the Army.

SUMMER TIME.—In the House of Commons last week Sir George Cave, in reply to Mr. Gilbert (Newington, W., L.), said:—The experience of the second year of summer time has confirmed the conclusions based on the first year's working of the scheme, and I think it will be in accordance with the general wish that summer time should be continued. As regards the period during which it shall be put in force, the hon. member will recollect that the question was investigated after the first year by a Departmental Committee which recommended the period from the second Sunday in April to the third Sunday in September. This recommendation was adopted by the Government last year. No decision has yet been taken as regards this year. And I can only say that the question of period will be carefully considered before the order is made.

COVERING POWER OF LENSES AND STRAY LIGHT IN THE CAMERA.

Many photographers when they purchase a lens have not the opportunity of testing its performance upon a plate very much larger than that which it is listed to cover, and so do not come to a clear realisation of what its properties are in respect to the qualities which commonly go by the name of "covering power" and "illuminating power." Generally speaking, it is assumed that covering power of a lens is a property which is to be desired to the fullest extent. The object of these notes is to set forth the doctrine that, within certain limits, the contrary is true, and that while we owe a great deal to the opticians for the progress they have made in providing lenses of great covering power we have at the same time largely blinded ourselves to the definite advantages of lenses of the older type which exhibit this quality to a much lesser degree.

It may first be desirable to obtain a practical definition of what is meant by covering power as distinguished from illuminating power. The former term relates to the size of plate, or rather to the diameter of field, which a lens of given focal length will cover with sharp definition to the margins when pointed upon a flat subject. The subject requires to be flat, for if it is one consisting of objects at various distances, a lens which possesses what is known as curvature of field may chance to exhibit better performance in the way of covering power than another which actually is superior. On the other hand, illuminating power denotes the size of plate or diameter of field which, in the same circumstances, is filled with definition *of a kind*. The definition may not be good, but nevertheless the lens will form some kind of image on the plate right up to the edges of the disc which mark the limit of illuminating power.

Now, in the views which are commonly expressed in text-books on photographic optics it would seem that the more covering power a lens possesses the better it necessarily is. Thus, to quote a passage in one manual on the subject, "the larger the circle covered by a lens of given focal length the better, because the lens can be moved about on the camera front without fear of ill-defined corners in the negative, and also because the lens can be used to cover a larger plate." Undoubtedly this expresses a large measure of truth, inasmuch as the conditions named in it correspond with those which prevail very frequently in practical photography. But in an extensive reading of text-books and catalogues dealing with photographic lenses I have rarely found any attention given to the effects which different lenses produce in these matters of covering power and illuminating power. While it is true that ample covering power has its advantages when you use the camera with the lens raised or lowered, or when you seek to cover a larger plate, it is perhaps not so clearly kept in mind that when you are not using a lens under these conditions the reserve of covering power is not then negatived or annulled, but has its effect in the way of illuminating the bellows of the camera, thereby creating a source of stray light within the camera which is a cause of many complaints of veil or flatness in negatives. This effect, of course, takes place equally whether it comes from great covering power of the lens or from its wide "circle of illumination." So far as concerns the creation of stray light within the camera, it doesn't matter whether the illumination of the bellows is due to the margins of an unsharp or a sharp image. The effect is just the same in producing a secondary source of light within the camera which, in the absence of means to cut it out, must have its effect upon the plate.

The outcome of these considerations is that for many of the purposes which come in the category of ordinary photography a lens of covering power such that its field extends very little beyond the dimensions of the plate will prove in practice to yield results which are thoroughly comparable with those by an anastigmat costing a good deal more. This applies to such work as copying, photography of ordinary views, and in general to subjects where (1) there is no call to bring the lens out of centre with the plate, and (2) where it is not necessary to work at a very rapid aperture. The anastigmat, with its large working aperture and its ability at that aperture to cover a relatively large plate, has tended to render us less appreciative of the results which can be obtained with the now despised R.R. type of lens in circumstances where one or other of these two conditions does not require to be fulfilled. It is true that the definition towards the margins of a plate yielded by an R.R. lens at its full aperture compares unfavourably with that of an anastigmat at its full aperture But when both lenses are stopped down to a medium aperture, such as *f*/16 or *f*/22, the difference in the performance of the two largely disappears, and in these circumstances the R.R., from its lesser degree of covering power and smaller circle of illumination, scores on the ground of yielding negatives of a degree of brilliance and sparkle which often it is difficult to secure with an anastigmat of similar focal length. I have no doubt I am telling a tale which is familiar enough to those who have lived through the era in photographic lenses which includes the coming of those of the anastigmat type. Old hands who have had the occasion and opportunity to compare the actual performance of the newer lenses with those which previously were their accustomed instruments, and under the conditions formerly applying to those instruments, have discovered for themselves that the merit of the anastigmat—let there be no thought of disparaging it—lies in the direction of creating better performance under fresh conditions which they render possible, rather than in improving the quality of work such as one was accustomed to turn out in the days when the R.R. was the universal lens and its limitations were recognised.

The moral of all this—and it is one which may not inappropriately be drawn to the notice of photographers in these days, when it is difficult to purchase anastigmat lenses—is that the precise purpose for which a lens is to be used should be carefully considered. It is not advisable to jump to the conclusion that an anastigmat, if it can be got, is necessarily going to do any better work than an R.R. of the same focal length. Probably it would surprise many of those who imagine that the anastigmat is the lens par excellence for copying to observe in process studios the frequency with which an R.R. figures on the copying camera. Moreover, the choice of an anastigmat of large aperture is apt to be particularly elusive when one of considerable focal length, such as 10 inches and more, comes to be purchased. Here another factor quite apart from that of covering power comes into play, namely, depth ~~of focus.~~ Assuming broadly that the depth of focus which is commonly called for in negatives is conditioned by the actual diameter of the lens stop (not by the *f*/ number), it will be seen that in using a long-focus lens it is generally necessary to use a medium or even a small stop to secure sufficient depth of focus. Obviously, then, there can be no useful purpose served in buying an expensive lens which works at *f*/4.5, when, for 90 per cent. of the subjects which are photographed with it, it requires to be stopped down to *f*/16 or *f*/22 simply for the purpose of obtaining sharp definition. This, again, is a point which I am sure is familiar to photographers who have had much experience in the use of long-focus lenses in general outdoor photography. It is another of those instances which leads one to the general conclusion that in photographic optical equipment, as in that for other crafts such as woodwork or metal-working, it is a bad practice to endeavour to make one tool serve several purposes. Most certainly that applies to lenses. While the anastigmat with its large aperture and its great covering power has its specific usefulness, the older type of lesser speed and lower covering power equally is unexcelled, as regards all-round quality of work, for certain purposes.

Graham M. Nicol.

GASLIGHT PRINTING FROM AMATEURS' NEGATIVES

There cannot be the slightest doubt that the kind of print most in demand among amateurs is a plucky gaslight print with a narrow white margin. However good the prints are they will always have a neater and far more attractive appearance with a masked edge. This naturally means a little more work on each order, although, of course, it pays to take this extra trouble in order to secure and retain the goodwill of one's customers. By arranging some little conveniences at the start it is possible to reduce this extra work to such an extent as very nearly to wipe it out of existence.

The first sketch shows a suggestion I made in response to a friend's request a few years ago. He had a developing lamp over his sink, and an ordinary electric globe over a table close by with a switch for exposing. In these circumstances, which amounted simply to amateur conditions of working, each print called for quite a series of operations, including opening and closing the packets of fresh and exposed paper. My suggestion consisted simply in a box open back and front supported as shown slightly slanting with a couple of metal-filament globes arranged as in Fig. 2, and a little ledge on the bottom edge to support a printing-frame of whole-plate size. A piece of ground-glass is necessary to diffuse and even up the light, which should be rather near to the negative to shorten exposures. I have found that reducing exposures in this way does not have the flattening effect on the print with gaslight paper that it has in bromide printing. If the box is larger than the printing-frame it is easy to fix a piece of strong cardboard with a suitable aperture on that side of the box. The other side of the box, the open front, that is to say, is covered with yellow fabric or paper. Quite a pale tint is safe for ordinary gaslight paper, and even for the more rapid portrait varieties, if these are handled carefully at a reasonable distance from the source of light. Hence, one can work in practically full light and judge the depth of prints to a nicety in developing without peering at them and straining one's eyes.

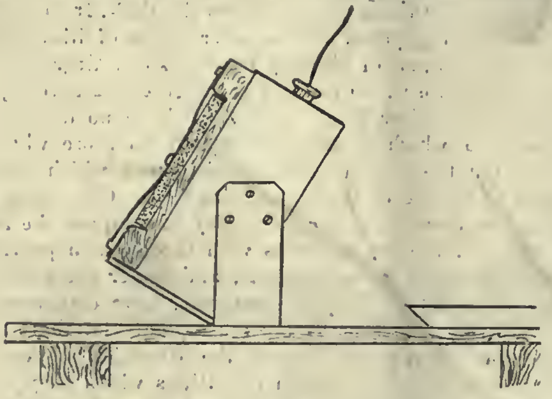

Fig. 1.

The method of working is to have the paper (enough for the order in hand), lying face down in an empty plate-box, placed in the shadow of this box. The paper is filled in the printing-frame by the aid of the yellow light, and the frame is then slipped on the ledge for exposure, after which the exposed sheet is placed face down in another plate-box. The paper will be quite safe in this way, as no direct white light can reach it. It is better to have a small stock of "soft" gaslight paper, in addition to the ordinary "contrasty" grade, in order to cope with the denser negatives, but the great majority of snapshot work is of the thin, under-exposed quality that is best rendered by a vigorous paper. A make should be chosen, however, that allows of fair latitude in exposure, and that will stand some little time—up to a minute or so if necessary—in the developer without staining. The better makes allow of this with care in working, and permit of slight variations which enable one to deal with difficult negatives, and get improved results. For this reason it is very false economy to buy a cheap grade of paper if one's aim is to retain custom by producing good work.

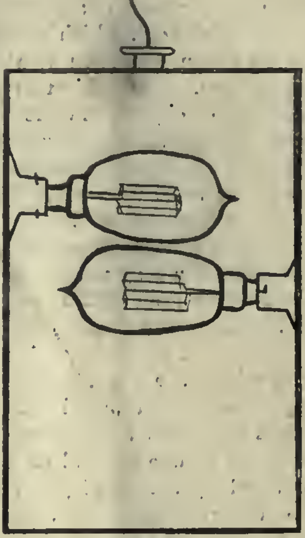

Fig. 2.

One very useful point in this direction, but one which is often overlooked, is the judicious use of the "pot. brom." bottle. Gaslight paper needs fairly fresh developer, preferably M.Q., and a normal exposure with a normal developer gives pure blacks. Now, too much exposure gives (with quick development) increased contrast, but at the same time tends to give greenish blacks. Too much bromide in the developer will also give green blacks. On the other hand, short exposure with prolonged development, which is useful in dealing with a rather "contrasty" negative, but must not be carried out in any extreme manner, will give a somewhat softer print, but of a colour inclined to blue-black. A developer containing insufficient bromide will give a distinctly bluish-black print. All this may sound very discouraging to one who has been used to bromide paper, and who realises that the requirements are prints of a level black colour, neither bluish nor greenish. A careful worker can, however, use these apparent vagaries to his own advantage by a very simple plan. This is to make up the developer without any bromide, and to have the latter of a definite strength, either

10 per cent. or saturated solution, in a dropping-bottle. Another way is to use a fountain-pen filler as a dropper. For the average M.Q. developer it will be found that one drop of 10 per cent. bromide in each ounce will give a pure black gaslight print with normal exposure, but the exact amount for any formula is quite easy to discover by means of a few trial slips. When printing, one can put the normal exposures in a box by themselves, the prints that have been over-exposed (to increase contrast) in another, and the ones with short exposures in a third box.

The developer is measured out, and about half the normal amount of bromide added and *well stirred*. If the bromide is not evenly distributed in the developer the prints are sure to be less satisfactory, and there is nothing like gaslight paper for showing up little carelessnesses like this. The fully-exposed prints are first developed in this bath, and it will be found that the tendency to greenish blacks caused by over-exposure will be balanced by the shortage of bromide which tends to blue. Having developed these, the remainder of the bromide is added, and the normal prints put through, and then a very few drops more bromide will counteract the bluish tendency of the under-exposed sheets. I say a few drops only for two reasons. One is that this under-exposure for softer results cannot be carried very far, and the other is that by the time these prints are reached the developer will be already in a half-used condition, in which it tends of itself to give a slightly greenish tendency. For this reason it is not wise to use developer to exhaustion; also used-up developer is far more liable to stain.

This brings me to the question of staining, for which gaslight paper has rather an undeserved reputation. To get stained prints is certainly easier than with most other printing processes, but once one gets the secret it is just as easy to avoid staining altogether. The first point is to renew both developer and the acid-hypo bath fairly often. Both are quite good for plates when partly used for gaslight work. The second point is to keep the print as much as possible away from exposure to the air from the moment it is wetted by developer until it has been in the fixer for at least twenty or thirty seconds. This means that it is better to use both developer and fixer of a fair depth, so that prints can be easily kept submerged. This need not mean large quantities of solution if dishes are chosen of a suitable size and fairly deep. For fixing, however, I always prefer a big bath with plenty of solution. This enables one to plunge each print right under the solution by means of a print paddle, and by the same means to move it about for a few seconds. It is just those few seconds in the hypo that make all the difference in preventing two definite kinds of stain. The "print paddle" also avoids any trace of hypo getting on one's developing-fingers, which is again fatal to good gaslight printing. Certainly it is advisable to rinse between developing and fixing, preferably running the print vertically through the stream of water from a tap. Where economy in the use of water is necessary (and in war-time it is a real saving to the community to economise in water), it is a good plan to draw the print to and fro through a large volume of water in a sink or a big dish. As I have had only two or three cases of staining among many thousands of gaslight prints made during the past few years simply by following the above methods, I think I can safely claim to have killed the stain bogey in gaslight work. It is true I have made a point whenever possible of getting an assistant to preside at the hypo-dish while I've been developing a large batch, say, anything over fifty prints. This is a great time-saver, as it is possible to concentrate all one's time and mind, as well as both hands, on developing, simply flinging each print as developed into the rinse-water.

I propose now to describe the special printing-frame I have used for this work. It is easy to adapt an ordinary frame as shown in the drawings, and if not quite ideal, it saves a lot of time, and makes masking less of a fiddling job. The frame is a whole-plate one, and mine has a spring which works on a sort of hinge, and clips automatically on pressing down the loose end. The other spring is removed, hand-pressure being used for exposures. Fig 3 shows the side view of the section of the frame with the back open, and Fig. 4 is a plan of the arrangement closed, the dotted line representing the opening of the mask. I should mention here that although a large variety of masks is required, the opening of each should have one side to come exactly in the same place in the frame, that is, just clear of the ends of the two small springs, the ends of which just project under the edge of the hinged back as shown by the dotted portions. By gluing fairly thick material on the back-board these two points will not affect good contact.

The two springs referred to are bits of thin spring brass or other metal let into a narrow strip of wood and fixed by small screws as in Fig. 3. The long spring of the printing-frame has two holes bored through, so that the wooden strip can be screwed to it. I think the other portion of the back is sufficiently described by the sketch.

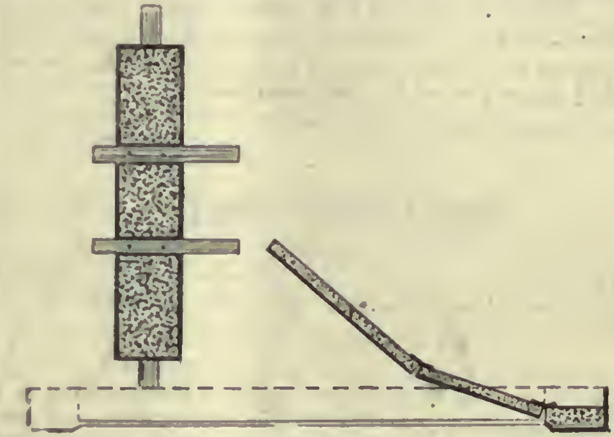

Fig. 3.

The modus operandi is simply to lay the mask—which is the full size of the frame, and has the aperture size and guide marks on it—either in white ink or marked on bits of gum-paper—on the glass in the frame. Then lay the film *on top* of the mask, adjusting it according to the subject, and by then closing the one large spring the points of the two smaller springs will grip the film just clear enough of the opening of the mask to allow a clean straight edge to be printed by the mask, but close enough at the same time for films which have been trimmed rather close, or of which it is not desired to mask off any more of the subject than can be helped. It is possible then to feed the paper without any fear of the mask or film slipping. The film can be slipped under the mask if desired, but I find that the opposite is easier and quicker in adjustment, and gives a scarcely noticeable diffusion to the edge of the white margin in the print, which I think is preferable to a very sharp edge, which is apt to catch the eye rather abruptly, especially in flat or fuzzy prints. In such cases the excessive sharpness of the margin would be by contrast to the detriment of a print rather than enhancing it, as is the object in view.

In the case of printing from glass plates the mask must nearly always be on the film side, unless cut rather small, and it is desirable to employ as a carrier a slip of card with an aperture cut on it to take the negatives. It is very undesirable indeed to keep a large stock of various sizes of paper to suit the enormous number of sizes of amateur negatives. It is more economical in the long run to have a fresh stock for the more important sizes only, even if it does mean trimming rather much off afterwards. It is pretty useless to try and print so as to require no trimming. There will be a lot of time wasted in "filling in," and the edge will never be clean like a trimmed edge, nor even all round either. I used a Trimerette as the handiest thing I could find for getting just the desired amount of margin all round every time. The lines on the celluloid enable this to be done, and it is easier to get it right than in a big trimming-desk.

I think I have described my method of sorting the finished prints before, but perhaps it will bear repetition. It is to lay out all the prints, irrespective of whose they may be, in lines on a clear table or bench according roughly to size and to type of subject. For instance, one line for quarter-plate groups, another for sea-scapes, and so on. When that is done, all prints from one negative being in a pile, of course, the first set of negatives is taken one at a time, and from the size and type of subject the prints can be picked out in an instant after very little practice. This plan makes for correct and clean handling of orders, and takes far less time and energy in the long run than any other I have tried. In fact, I have never been able to find any other real *method* for this part of the work except marking the backs of prints with the order number, which I found a terrible time-waster, as well as spoiling the clean appearance of the prints, and tending to stress marks.

D. Charles.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Care of Chemicals in Bulk.

When a keg of hypo or carbonate crystals is opened, it is not often that the end knocked out retains any resemblance to a lid; as a rule, it is just three or four bits of wood, and even when it is removed carefully the circular piece is not by any means an airtight dust-proof cover, or even a handy one.

If chemicals are to keep their quality while in stock they need at least a little protection, and where sulphite, carbonate, and hypo are kept in casks or barrels it is a good plan to saw the bottom third out of a few old ones. Wide barrels should be chosen if possible, and those with wooden hoops, which are fairly common at present. The third, if sawn off to include the hoop, makes an excellent lid, and though not actually airtight, is sufficiently near to it, and will keep out all dirt and other foreign matter, such as parts of the weighing tackle, which seem to have a penchant for investigating open kegs. A lid so made should be examined for nails and also old traces of chemicals, and both should be carefully removed. When two or more casks are so "lidded" it is advisable to number them; this will prevent the lids becoming mis-sorted, and so preserve each chemical from traces of the others.

A rope handle can be added if desired, but the lid should not be bored, or it may defeat its own purpose. The rope can be tied round under the smaller hoops and a strand tied across.

If the cheap modern kind of keg is used, one of these lids can be made by almost anyone in less than half an hour, and will last for years; the well-made iron-hooped barrels are sometimes hard to cut, and so with them it is a longer and a harder job.—Thermit.

Good Prints from Bad Negatives.

It is not every printer who enjoys a guaranteed run of perfect negatives, not even among the class houses, and it sometimes occurs that superior prints are required from inferior negatives. When using development papers one of many serviceable dodges is to use scraps of ground glass to balance up an irregular negative. The broken bits can be kept in a plate-box, and by arranging them on the horizontal diffusing screen in the printing-box it is possible to even up a harsh negative to any extent, and also to put a little contrast into a flat one.

When printing off multiple negatives pieces of matt glass (cut the exact size of a single negative) will save a lot of cutting, and, incidentally, printing; and the necessity for slicing sheets of prints in the dish (when the different negatives on a plate are of different densities and have been printed together) disappears. Better prints result from this method than by dodging the developing, for when the pieces of matt glass are arranged aright, every part of the print gets its correct exposure and develops normally.—Thermit.

An Easy Method of Writing Titles on Negatives.

A quite effective method of doing this is to write with "Photopake" with a small brush or pen, but as the writing must be done backwards and from right to left, it requires a good deal of practice and a lot of skill, to make it neat and presentable. A much easier way is to place the negative in the retouching desk upside down, with the film side outside, and to put on the writing (commencing at the left and working to the right hand, as in ordinary writing, but putting on the letters upside down). It will be found in practice that many of the letters are the same each way, and the others no more difficult to make one way than the other. The whole process is very much quicker and simpler and the letters easier to form than when writing backwards. To simplify the matter still more it is best to make a key alphabet. This can be done in a few minutes. Get a piece of glass—an old negative which has been cleaned will answer the purpose—and write on it in "Photopake" a set of letters from A. to Z, and numerals from 1 to 10, of the style you intend using. Block letters are advised as being very easy and effective. These are written in the ordinary way on the glass. When it is quite dry the glass can be turned over and placed upside down near the work in hand. We shall then see at a glance the shape and formation of each letter we wish to use. With a very little practice we shall be able to do excellent work by this simple method.—E. Hinge.

Analecta.

Extracts from our weekly and monthly contemporaries.

The Angle Included by a Lens.

The angle included by a lens indicates the size of plate which will be covered by it (says a writer in "Photography and Focus" for January 23), and can be found by observation, provided the lens can be put on a camera with a ground-glass screen larger than the field covered by the lens. The field is then seen to be of circular shape, and the size of the circle over which the definition is satisfactory can be noted. If the diameter of such a circle is marked out on a sheet of paper, and on the centre of that diameter a line is drawn perpendicular to the diameter, the length of such line being made equal to the focus of the lens, the other end of the line being joined to the extremities of the diameter by two straight lines, the angle between these two lines will be the angle included by the lens. On the other hand, if we know the angle included and the focus, we can find the size of plate which will be covered by ruling a line equal in length to the focus, drawing from one end of this line two other lines, each making with the first line an angle equal to half that included by the lens, and producing these lines until they cut a line drawn from the other end of the first line and at right angles to it. Such a line will then be a diameter of the field covered by the lens, and a circle with that diameter can be described. Any plate of such a size that it will lie wholly within that circle we then know will be covered by the lens. Put another way, the lens will cover any plate the diagonal of which is not greater than the diameter of the circular field covered by the lens.

FORTHCOMING EXHIBITIONS.

February 2 to 9.—South Glasgow Camera Club. Secretary, John Baird, 164, King's Park Road, Cathcart, Glasgow.

February 9 to 16.—Glasgow and West of Scotland Amateur Photographic Association. Secretary, G. S. McVean, 125, West Regent Street, Glasgow.

February 21 to 23.—Leicester and Leicestershire Photographic Society. Sec., H. C. Cross, 80, Harrow Road, Leicester.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, December 3 to January 12.

Colour Printing.—No. 18,138. Photographic method of colour separation for colour printing. J. R. Elsworth.

Photography.—No. 18,141. Photography. J. T. Smith.

Coloured Photographs.—No. 18,648. Method of producing coloured photographic views. E. Pedersen.

Cameras.—No. 18,918. Roll-film cameras. H. Workman.

Cameras.—No. 522. Photographic cameras. International Patent Licensing Corporation.

Cameras.—No. 19,299. Cameras. M. Niell.

Colour Cinematography.—No. 17,881. Polychrome cinematography. A. Hamburger.

Colour Photography.—No. 17,882. Colour photography. A. Hamburger.

Colour Photography.—No. 17,883. Multi-colour photography and cinematography. A Hamburger.

Non-flam Film.—No. 18,410. Manufacture of non-inflammable films for cinematography. W. G. Stevenson.

Stereo-Cinematography.—No. 19,302. Stereoscopic cinematography. L. L. Ruffier.

Cinematography.—No. 677. Cinematography. A. Garbarini and L. Manclaire.

Trade Names and Marks.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register :—

Serteka.—No. 379,791. Chemical preparations for preserving photographic developing solutions. George William Oscar Secretan, 210a, Tufnell Park Road, London, N.7; photographer.

REGISTRATIONS RENEWED.

Ensign.—No. 260,822. Registered by Houghtons, Ltd., in 1904 (Class 3).

Ensign.—No. 260,823. Registered by Houghtons, Ltd., in 1904 (Class 8).

Ensign.—No. 260,824. Registered by Houghtons, Ltd., in 1904 (Class 15).

Ensign.—No. 268,825 Registered by Houghtons, Ltd., in 1904 (Class 16).

New Books.

The Wellcome Exposure Record and Diary, 1918. London: Burroughs Wellcome and Co. 1s.

We are glad to find that paper shortage has failed to interfere with the production of the ever-popular exposure diary of Messrs. Burroughs Wellcome, which reaches our table almost at its accustomed time, with no mark of a world war upon it except that it is, perhaps, a little thinner, by no means a feature which can be criticised in a volume intended particularly for the pocket. We have so often, in referring to past issues of the diary, dwelt upon the point of perfection to which it has been brought and the real difficulties which must confront the compilers in introducing any new feature, that one minor improvement in the present volume deserves to be mentioned—namely, a little wallet of stiff card attached to the inside front cover, within which small prints or other papers can be placed for security. The text portion, which deals with processes of photography carried out with the tabloid chemical preparations of Messrs. Burroughs Wellcome, has been the subject of considerable revision, so that it occupies a lesser number of pages, but without any sacrifice of the explicit directions which the amateur photographer appreciates. That most essential part of the diary—the exposure calculator and the tables accompanying its use—remain the same, except that the list of sensitive plates and films now includes only manufactures of the Allied countries, with the exclusion of any of enemy origin. We are quite sure that this feature alone will once again recommend the volume to innumerable purchasers, who can obtain it in several editions—one for the Northern Hemisphere and for use in the Tropics, and two others, one for use in the Southern Hemisphere and another in correspondence with conditions in the United States.

The Scientist's Reference Book and Diary.—The 1918 edition of this pocket diary, issued by Messrs. James Woolley and Co., Ltd., Manchester, price 2s. 6d., preserves the features which for twenty years past have rendered it valuable to those in scientific occupations. Within 150 or so pages is collected a mass of data specially in reference to meteorology, astronomy, agriculture, weights and measures, chemistry and chemical analysis, physics, physiology, and hygiene. The diary proper is modelled in convenient fashion, and, unlike many other pocket diaries which we see, includes, we are glad to note, space for a Sunday in each week. In its stout leather covers the diary is one which will render its services to the possessor throughout a twelvemonth.

The Penrose Process Diary.—The pocket book and diary issued by Messrs. A. W. Penrose and Co., 109, Farringdon Road, E.C.1, appears for the year 1918 in its accustomed form and will once again be welcomed by those in the photo-engraving trade for its comprehensive collection of working details, formulæ, and tables connected with the various photo-mechanical processes such as line and half-tone engraving, three-colour work, collotype and photo-lithography, and photogravure. In addition it contains special notes on the preparation of originals, the wet-collodion and collodion emulsion processes, and includes besides such general photographic formulæ as developers, fixing baths, reducers, intensifiers, etc. Its editor, Mr. William Gamble, is to be congratulated on having maintained the continuity of this most useful pocket book.

Quantity Photographic Printing.—There is now no occasion to withhold reference to the numbers of our little contemporary the "Photo-Miniature" until supplies reach this country, for the reason that importation in bulk is now prohibited, and those desiring any issue of our contemporary require to buy it direct from the publishers in New York, Messrs. Tennant and Ward, 103, Park Avenue, at the price of 25 cents. The latest issue, No. 166, is one which will interest professional photographers in this country and particularly the many who are engaged in the production of portrait and other prints in large quantities at popular prices. It describes methods of machine printing, vignetting and bordering, development, fixing and washing as they are practised in establishments in the United States working upon the largest scale. Among the items which seem to us to be novel is a triple tank for the hot-toning of prints by hypo-alum. Another is a rotary "buffer" for the preliminary polishing of ferrotype or glass plates on which prints are to be squeegeed. We referred only last week to the many opportunities which still remain for the greater application of electric power to photographic operations. The present issue of the "Photo-Miniature" is a reminder of certain directions in which the cleanly power of an electric motor can be utilised.

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Prosch Flashlight System.—Since mentioning a month or two ago the very comprehensive catalogue of the lamps and powders made by the Prosch Manufacturing Company, 334, Fifth Avenue, New York, we have received a new edition of the list, which is a still more complete and detailed specification of the many requisites for flashlight photography of all kinds of which the company are the makers. These, for example, are the various forms of collapsible and fireproof flashbags designed for flashlight photography in studios, at banquets, and for at-home portraiture. The catalogue contains a very great deal of practical instruction in the way of placing the flashlight illuminant, ignition, etc., and we can imagine that no photographer anxious to inform himself of the full facilities which are at his disposal, or, at any rate, will be at his disposal when transport facilities between here and America are again normal, will neglect the occasion of obtaining this price list, which is sent free on application to bona-fide readers of the "B.J."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SATURDAY, JANUARY 26.

Huddersfield Naturalist and Photographic Society. "The Natural History of Dyes and Dyestuffs." L. Neaverson.
Stalybridge Photographic and Scientific Society. "Enlarging." J. Kershaw.

MONDAY, JANUARY 28.

Dewsbury Photographic Society. "Chat on 'Photograms.'" W. E. Gundill.
Bradford Photographic Society. "How to Do It: Some Methods and Manipulations in Photography." J. F. Seaman.

TUESDAY, JANUARY 29.

Royal Photographic Society. "In the Alps with a Camera." Dr. C. Atkin Swan.
Birmingham Photographic Society. "Tonia." Harold E. Jefferies.
Hanley Photographic Society, Y.M.C.A. "Landscape Photography." J. Wright.
Keighley and District Photographic Association. "Wild Cumbria." J. W. Shuttleworth.
Stalybridge Photographic and Scientific Society. Annual meeting.
Monklands Photographic Society. "After Treatment of the Negative." Practical Demonstration. A. D. Wilson.
Hackney Photographic Society. "A Walk Round Wanstead Park." A. E. Farrants.

WEDNESDAY, JANUARY 30.

Croydon Camera Club. Annual General Meeting.
Bristol Photographic Club. "Garden Portraiture and Studio Portraiture." Mrs. F. Wild and Miss Brownlee.
Ilford Photographic Society. "Northern Italy," W. Sanderson, J.P.

THURSDAY, JANUARY 31.

Hull Photographic Society. Lecturettes on Excursions.
Liverpool Amateur Photographic Association. "Some Investigations in Three-Colour Bromoil." S. H. Williams.
Hammersmith (Hampshire House) Photographic Society. "Bromoil." G. B. Clifton, F.R.P.S.

ROYAL PHOTOGRAPHIC SOCIETY.

MEETING held Tuesday, January 22, the President, Mr. John H. Gear, in the chair.

Mr. R. H. Lawton read a paper on "The Manipulations which go to Successful Picture-Making," in which he dealt chiefly with and demonstrated methods of retouching the negative as a means of improving pictorial effect. Mr. Lawton appeared as a stout champion of such methods, and showed by comparative examples the power which they afforded, and also the effects of their misuse.

A hearty vote of thanks was accorded to him.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A MEETING of the Council was held on Friday, January 11. Present: Messrs. A. Basil, Gordon Chase, A. Corbett, C. F. Dickinson, A. Ellis, S. H. Fry, W. E. Gray, R. Haines, A. Mackie, R. N. Speaight, Lang Sims, F. G. Wakefield, Frank Brown (Leicester), W. B. Chaplin (Windsor), A. H. L. Chapman (Swansea), T. Chidley (Chester), and H. C. Spink (Brighton).

The draft of the annual report of the Council was read and passed for printing and circulation to members.

The Hon. Treasurer gave particulars of his balance-sheet for the past year, showing that the subscriptions paid was the highest number collected since the Association was established.

The death of Mr. F. A. Bridge, who was one of the founders of the Association, and had served on the Council 1901-10, was referred to, and it was agreed that his executor should be written to expressing the regret of the Council. Among the cases in hand for members were a complaint against a firm of dealers in second-hand apparatus, an important case arising from the sale of old negatives involving an important legal point; a complaint against a firm of enlargers and trade printers; a claim against a member by his customers for delivery of negatives taken in the ordinary way of business.

The president read correspondence relating to the Lang Sims scheme, and also a letter from a member urging the Council to oppose the inclusion of "photography" among unnecessary trades.

At the conclusion of the business a special Council meeting was held, in accordance with Rule 12, to nominate officers for the ensuing year.

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A BARNET WALL CALENDAR.—Messrs. Elliott and Sons, Ltd., Park Road, Barnet, Herts, send us a specimen of a most attractive wall calendar for 1918, of which they have a limited number for distribution to their professional customers on application. The calendar, while giving prominence to the Barnet manufactures, bears a most attractive study of a girl's head in colours, by Philip Boileau.

Commercial & Legal Intelligence.

A PHOTO-CANVASSING SWINDLER.—At Blackburn last week, Lionel Harris Goldberg (forty-three), of Edge Lane, Liverpool, was charged with obtaining by false pretences from Harriet Howard the sums of 2s. and 3s. (twice), and also 5s. 6d. from Elizabeth Keogh, and 4s. 6d. from Lily Weaver. All the alleged offences were in December.

Mr. J. G. Radcliffe, who prosecuted on behalf of the police, said that in all the cases the methods of prisoner were much the same. He set himself out as the British Enlargement Company, and on seeing photographs on the walls of the homes he visited he suggested it would be a nice thing to have them enlarged and framed. He would obtain sums on account, and promise to bring the enlargements and frames. In two of the three cases neither enlargement nor frame was received, but in one case the enlargement was delivered, and afterwards taken away because the owner decided to have it framed. As the frame did not come, Mrs. Howard went to prisoner's so-called place of business in Butler Street, Blackburn, but found he had left. She also ascertained that there had been neither enlarging nor framing there, and that prisoner had left owing his landlady 12s. Goldberg was very smartly traced by Detective-Sergeant Barnes to Liverpool, where he was arrested. He (Mr. Radcliffe) asked for heavy punishment.

The Magistrates' Clerk said prisoner had put in a statement blaming the drinking of his second wife for his downfall.

When the landlady was asked what sort of woman prisoner's wife was, she replied that she seemed to be a very decent woman. She was never intoxicated.

Chief Constable Hodson remarked that prisoner, his wife and family came to Blackburn last November. Since his arrest there had been twenty-one complaints about him. He was wanted by the Leeds police, who had had seventy-eight complaints, and also by the Manchester police. He enlisted in the Army in April, and deserted in May. He had been convicted at Hull, Manchester, and Longton for various offences, including false pretences, and neglect of family. He was a travelling swindler.

The Bench passed sentence of three months' hard labour in each of the three cases, the terms to run consecutively. Alderman Green, Chairman of the Magistrates, said they were sorry they could not give him more.

AT THE LONDON BANKRUPTCY COURT recently, before Mr. Registrar Hope, an application was made for the discharge of Chester Park Crawford, described in the receiving order as C. P. Crawford, of "Cameragraph," Craven House, Kingsway, W.C. The statement of affairs filed by the bankrupt disclosed liabilities amounting to £9,829, and assets nil. The bankrupt had failed on two previous occasions, viz., in 1905 and 1910. He came to this country from America in 1907 with the idea of opening up and running a number of skating rinks in various parts of the country. In 1912 he was engaged in a scheme for building and renting music halls in France and Belgium, and lost £512 over the venture. Subsequently he secured from an American company the right to sell on commission a certain photographic machine called the "Cameragraph." In 1915 he sold his interest in the concern to a company called the Cameragraph Sales Agency, Limited, which company was formed with a capital of £5,000. Some of the shares in the company were sold for £338, whilst others were handed to people who had rendered him assistance. He acted as managing director of the company until March, 1917. The official receiver reported that the debtor had committed the following offences against the Bankruptcy Act: That his assets were not of a value equal to 10s. in the £ on the amount of his unsecured liabilities. That he had contributed to his failure by rash and hazardous speculation, and that he had failed on two previous occasions. Eventually the learned registrar suspended the discharge for four years.

LEGAL NOTICES.—Notice is given that the names of the Bon Marché Studios, Limited; Pembroke Studios, Limited; Photo-Telegraph and Cable Company, Limited; and the Usa Photo Papers, Limited, have been struck off the Register of Joint Stock Companies, and are dissolved.

Notice is given that at the expiration of three months from

January 18 the names of the Belgian Artists, Limited; Dean Engraving Company, Limited; International Artists' Club, Limited; Photo-Drama Company, Limited; and the Whitefriars Studio, Limited, will, unless cause is shown to the contrary, be struck off the Register of Joint Stock Companies, and will be dissolved.

Correspondence.

_ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

_ *We do not undertake responsibility for the opinions expressed by our correspondents.*

ROYAL NAVAL AIR SERVICE—PHOTOGRAPHIC SECTION.

To the Editors.

Gentlemen,—I notice that in the "Answers to Correspondents" (page 35) of the current issue of the "British Journal of Photography," a reply to a correspondent states that applications for entry into the Photographic Section of the Royal Naval Air Service should be made to "Officer Commanding Photo Section, 45, Victoria Road, Chingford."

I have to point out that this is an error. All applications for entry into this section should be addressed as follows:—

The Officer in Charge,
Photographic Sections R.N.A.S.,
"Whitehall,"
Chingford, E.4.

—I am, Sir, yours faithfully, PERCY B. MURRELL,
Lieut.-Comdr. R.N.V.R., Officer-in-Charge.
"Whitehall," Chingford, E.4, Essex, January 19, 1918.

WHITE BACKGROUNDS IN SKETCH PORTRAITS.

To the Editors.

Gentlemen,—I notice the subject of the white background has again cropped up. I am certain a great deal of the difficulty is brought about by internal reflection in the lens from the white vignetting card in front. The shadows of the figure get clogged up before sufficient density is obtained in the ground. I got over the difficulty myself by taking out the back combination, and pass on the hint for what it is worth. Where the studio is too short for resorting to this method a single lens of suitable focus could be used.

And this leads on to another subject—viz., the folly of the average photographer's respect for highly expensive lenses. Absolutely as good work can be done with moderately cheap lenses. What the public wants—the ordinary public as well as the most highly intelligent section of it—is expression, always expression; it does not really care an Indian dam about a hundred little finickinesses that seem to perplex a large majority of our craft. Human psychology more than any other of the "ologies" is the study for such of us as would excel.—Yours faithfully, F. FINDLAY.

Studio-on-the-Hill, near Auchtermuchty, Fife.
January 15, 1918.

MISSED BUSINESS.

To the Editors.

Gentlemen,—Permit me to congratulate you on again sounding the gong against raids by trickery, made principally by the Whitechapel fraternity on the legitimate business of photographers.

It has always been a surprise to me that the R.P.S. has not interested itself in the matter, and found means to protect their members and the public against constant misrepresentation. I am of opinion this could be done now there is a shortage of materials by stopping the cheap paper manufacturers.

The root of the trouble is competition. I believe the producers of these funereal horrors would welcome a "Controller" to keep them all in line.

Many of them are capable of producing good work; a little extra trouble and a little extra expense and they could command twice the price, with credit to themselves and satisfaction to the public.

Town and country have been flooded with "soot and whitewash" memorials sad enough to make our gallant heroes rise from their graves as a protest against framed "ghosts" banging to their memories.

I hope the god of war will include in his reforms the extermination of these cheap and nasty enlargements, together with the gang of canvassers who have been such annoying pests for years past.—Yours truly, A. VERNON GODBOLD.

98, St. Asaph Road, Brockley, S.E.4.
January 21, 1918.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

B. A. G.—220 v. half-watt lamps are not the slightest good on a 200 v. circuit. If anything, half-watts require to be slightly over-run—i.e., work on a circuit of a little higher voltage than that for which the lamps are made.

T. E. S.—The best little book you can have, and, in fact, the only one, is "The Portrait Studio," a reprint, with additional matter, from the "B.J.," illustrated, with diagrams of studios and accessories; price 7d., post free.

J. S. H.—There are no books on stereoscopic photography in print. You might possibly be able to obtain a second-hand copy of "Stereoscopic Photography," by F. Drouin, translated from the French, from a firm like Messrs. Foyle, second-hand booksellers, Charing Cross Road. There is another, No. 98 of the "Photo-Miniature," but it is not obtainable at the present time except direct from Tennant and Ward, 103, Park Avenue, New York, price 25 cents.

ENCLOSED ARC GLASSES.—1. Can you inform me what to use to clean the globe of an enclosed arc? 2. Also the means to refresh or whiten the asbestos of the arc reflector?—ARC.

1. Methylated spirit well rubbed over will clean off a lot of the deposits, but to make bright, the best thing is a little hydrofluoric acid, rubbed in with a tuft of soft paper. Acid is very corrosive of skin, so exercise care. 2. Mix ordinary whitening with skim milk and apply with a brush.

H. and D.—Will you kindly answer the following query? I have some panchromatic plates marked 250 H. and D. I wish to know the speed of these on the Wynne Meter and how to make the calculation for myself in future.—A. D.

If you want a working comparison we should say 80 to 90 Wynne, but there is no regular rule for conversion of H. and D. into Wynne speeds owing to differences in the way in which H. and D. speed numbers are determined.

E. P.—Vignettes in machine printing by strip and other machines are very largely put in on the glass-side of a negative with an air-brush, using a quick-drying coloured varnish such as you can get from the Aerograph Co., 43, Holborn Viaduct. Failing your own facility in using an air-brush, we should say the best means would be to get a few vignette glasses made up, either on tissue paper affixed to glass and treated with a stump and opaque, or done for you with an air-brush by one or other of the trade firms who go in for air-brush finishing.

C. B.—In order to find the F. number, it would probably be sufficiently accurate for your purpose to focus the lens on a distant object, say a church spire half a mile away, and then, without disturbing the focus, measure the distance from the lens diaphragm to the focussing screen. Divide this distance by the diameter of the largest stop, and you get the F. number. We do not see how we can tell you to distinguish different types of lenses. The ability to do so is simply the result of long experience, as in second-hand dealing of various objectives.

M. B.—Very likely the greater closeness of the plates has something to do with air-bells sticking to them, but we do not think it is enough to account for the difference you find between the two tanks. We have had the same trouble in using porcelain tanks in which the plates were comparatively far apart, and then we got over it entirely by ceasing to lower the plates into the tank after the developer had been put in, but, instead, putting the plates in first and "dumping in" the developer solution vigorously. We would sometimes pour off the developer and immediately pour it back again, and found that we got absolutely no air-bells when following this plan. Perhaps lowness of temperature also has something to do with your getting air-bells under present conditions.

Anti.—We see where part of your trouble is. Probably the Dallmeyer 3 D. which you are using is much too long in focus for the enlarger. The best focus for a half-plate enlarging lantern is 8 or 9 inches. If you could use an *f*/4.5 anastigmat of about this focal length you would probably find that your exposures were very much shorter. If such a lens is not available, the best alternative would be a cabinet portrait lens of *f*/4 aperture, which might be of focus up to 10 or 12 inches. This would answer perfectly for enlarging portrait negatives, but would not be so suitable as the anastigmat for negatives of subjects where you wanted sharp definition right up to the margins of the enlargement. We think that by looking after the lens question, in conjuction with a good light like the "Howellite," you will be able to bring your exposures down to a reasonable time.

Zeiss Triplet.—A friend has shown me a lens with the following: "Carl Zeiss, Jena Triplet 1 : 48, F50cm." on it. It is large, the glasses being 4in. diameter, iris diaphragm. Focus about 14 ins. Has yellow screen on front. Evidently fitted in aluminium. It is damaged in metal parts, and iris is not working, but glasses are in perfect condition. Can you say what was probably the original value of it?—Friend.

The Zeiss Triplet lens was placed on the market about 1891, of aperture *f*/6.3, but we cannot reconcile the data you give with those published in the price lists then issued. Apparently the longest focus which was supplied was 16⅛ inches (= 41 cm.). If your lens is correctly marked, its focal length should be 19¾ inches (= 50 cm.). The 16⅛ in. lens was originally issued at a price of £20, but, owing to its early withdrawal, there are so few of these lenses about that it is impossible to say what is a present price for it.

Enlarging with Half-Watts.—1. Is a 100-c.p. half-watt lamp a satisfactory illuminant for half-plate lantern with condenser? 2. Would a 1,000-watt lamp with ground glass screen give a light which could be used without a condenser for enlarging?—A. B.

1. The ordinary pattern of half-watt lamp—that is, with the circular form of filament, is not a good one for enlarging with a condenser. You want a focus type of lamp for this—that is, one in which the filaments are brought within a smaller area, but we learnt only recently that they are not now being made owing to the great call for the ordinary pattern. 2. Yes, a very good illumination can be got with a high-power lamp placed in a box with white walls and with a screen of ground glass or flashed opal an inch or so from the negative on the side towards the light. In the "B.J." of March 30 last, also in the forthcoming "Almanac," is a description of vertical enlarger arranged with a lamp of this kind.

Dallmeyer Portrait Lens.—1. I have got a 2 B Dallmeyer patent portrait lens, but I don't understand its working. Could you oblige me with an explanation? When I focus on the outside of a plate the centre is fuzzy, and when I focus on the centre the outside is fuzzy. Around the back end of the lens are four groups of notches, which I think has something to do with it, but I can't find out how. 2. Can you tell me, also, where I can get a studio camera shutter of the circular bellows pattern refitted with a bellows, and about how much it would cost?—D. Anderson.

1. Portrait lenses of large aperture, such as the Dallmeyer 2 B., usually have a very round field. You must, however, recollect that the lens you have is only sold to cover C. de V., and must be stopped down if used on a larger plate. The notches on the back cell are to indicate the amount of unscrewing when the diffusion of focus arrangement is used. For sharp definition the focus notches must be opposite the little peg in the other part of the back cell. The more the notched portion is unscrewed the softer the definition becomes. 2. You can get the shutter repaired by the Altrincham Rubber Co., Altrincham, Cheshire.

◆

Lilywhite Delivery by Coal Gas.—Messrs. Lilywhite Ltd., so we notice from a recent paragraph in "Motor Cycling," are making use of the now very common "gas-bag" for the motor used in the delivery of their commercial photographs, etc. A B.S.A. motor-cycle has been adapted for use with gas, and has proved satisfactory even upon the steep gradients which are to be found in Halifax and the neighbourhood.

Revised Camera Prices.—Messrs. Houghtons, Ltd., send us a twelve-page list of revisions of prices of cameras, the figures in which will serve to correct those in the latest large list of the firm, namely that of 1916. A 1918 edition of the "Ensign" catalogue is in course of preparation for issue in March, and will be obtainable by dealers at the rate of 15s. per 100 copies, including the printing of dealer's name and address on the back outside cover.

Mr. J. E. Ellis, photographer and photographic dealer, of Valletta, is, we are glad to see, among those whose names are published in the Malta "Government Gazette" as having rendered valuable services in connection with the war. Mr. Ellis, it is particularly mentioned, has provided relatives of Service men buried in the Malta cemeteries with a photograph of the grave free of charge, and in other ways has rendered assistance to the sick and wounded.

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The Summary of contents which usually occupies the lower half of this column will be found at the foot of the page overleaf and will continue to be placed there whilst its regular position is required for notices relating to the forthcoming "B.J. Almanac."

When to Get the Almanac.

In these notes last week it was said that the date of publication of the Almanac would be announced at the earliest opportunity. We then anticipated that such could be done in this issue. Unfortunately, at the time of writing it is not possible to state the day precisely. Equally, we cannot defer the announcement until next week because very likely the Almanac will be on sale before the "B. J." of February 8 reaches its readers, and if we waited until then we should have failed in our promise to notify the public exactly when the 1918 Almanac will reach dealers in the United Kingdom.

On the horns of this dilemma what we had better do is to say that, judging from present supplies, the Almanac should be on sale at the same time as next week's "British Journal." It may be a day or so later; on the other hand, it may be a little earlier. At any rate, this is the best we can do in the way of advertising to our readers when they should call in at their dealer's to secure copies before the very limited surplus supply is exhausted. We are all nowadays familiar with the stereotyped retort of the grocer or butcher—"None to spare." It is nearly the same as regards the Almanac.

We should repeat here the reply which our publishers have had to make during the past few days to many individual applicants—viz., that no more copies are now at their disposal. Sales are in the dealers' and booksellers' hands, and if application be made promptly at these establishments it will be possible, we hope, for the great majority of would-be buyers of the Almanac to secure copies. Some, we fear, must go without, and it is our regret that we can do no more than state plainly how things stand.

EX CATHEDRA.

Over-Development. No matter what skill may be exercised in lighting and posing a sitter, it is all wasted if it is not faithfully rendered in the print. The exposure may be correct, but if the development be carried even a little too far the scale of tones is altered and the picture suffers more or less, and it is generally more. One of the principal differences between really good and merely ordinary portrait work will be found in the quality of the high-lights, those of the face being the most important, while the draperies are hardly of less consequence. In the good portrait the flesh has its true value and texture, and the draperies give some suggestion of the material of which they are composed, while in the poor one these delicate nuances are lost, and the result is as if a coloured plaster-cast had been photographed instead of a living person. This defect may occur from over-lighting, but in the winter it is generally due to a poor light, which gives a picture lacking in roundness. And this is made worse by the use of too warm a developer, which rapidly penetrates the film and chokes the delicate shadows in the lighter parts of the subject. When the average operator uses warm developer he is very apt to overdo it, and to work at a temperature in excess of that prevailing in the summer. Recently we had the curiosity to test the temperature of the solution a young assistant was about to use, and found it to be about 85 deg. Fahr. It was, therefore, not surprising to find that the negatives he had already developed were of the plaster-cast variety. The only safe way to obtain uniform quality is to develop for a fixed time at a fixed temperature. Judging by looking through the negative or at the back of the film is an unsafe practice, for a plate usually has a thicker coating of emulsion at one end than it has at the other, and it is just an even chance whether the face falls on the thin or the thick end.

* * *

Americans' Copyright in Britain. We are very much obliged to Mr. Robert Wallace, the honorary secretary of the Scottish Photo-Pictorial Circle, for calling our attention, as he does in the letter which we print upon another page, to the Order in Council of February, 1915, which has definitely stated the conditions to be observed by American citizens or persons resident in the United States in order to secure copyright protection for their work (photographs) in this country. The text of the Order shows that the interpretation which we laid upon the earlier and more general proclamation is not the correct one. Our American friends should therefore notice that it is necessary for them to register the copyright in their photographs at Washington and to comply with the United States regulations in the matter of marking published copies just as they are accustomed to do for the purpose of legally sustaining copyright in their own country. The arrangement is, in fact, something between that which was originally contemplated in such individual reciprocity agreements, and that which is embodied in the terms of the Berne Convention. As Mr. Wallace very truly says, the provision of the opportunity for addition to an Act of Parliament by Order in Council provides opportunities for adjustments of this kind. Unfortunately, Orders in Council are not widely published, and unless the practice is adhered to of studying each issue of the "London Gazette," the introduction of modifying legislation may fail to be noticed.

* * *

The Art of Selling— The great bulk of the British public believes that making sales is a very easy matter, which is within the reach of any untrained person, being in fact as simple as poking a fire or editing a newspaper, either of which performances the looker-on feels that he could do better than the man who is holding the poker or filling the chair. This is true in a limited sense as far as salesmanship is concerned, as the popularity of slot-machines proves, always provided that the customer requires just what the trader has in stock and that the latter is satisfied with supplying that and no more. We fear that many receptionists belong to this class, and that business suffers accordingly. The photographer, usually no salesman himself, is fairly well satisfied with the business done, because he is kept busy and making a comfortable living, but does not realise that a live saleswoman could, without increasing his overhead expenses, add a very substantial percentage to his profits.

* * *

—and a New Receptionist. Some time since a friend had the misfortune to lose his receptionist, a lady in whom he had a well-deserved confidence, and engaged a successor, whose quiet demeanour did not indicate any special talent. He was quickly undeceived. Her first action was to overhaul his stock of frames and other sundries, and to ask for specimens mounted in certain styles. In a few weeks he found that without increasing the number of sittings, the takings had grown considerably. The demand for the better classes of work was greater and the sales of frames, miniatures and enlargements had greatly improved. The reason was that the new assistant, instead of being merely polite and obliging, had a quiet enthusiasm in her work, and was able to direct the wants of the customer to the lines in which she was interested, without gush or apparent pushfulness. The most successful salesman of photographs we ever encountered had learned the art of selling in a jeweller's shop. Knowing little of photography, he had a good knowledge of psychology, and found the handling of a certain class of people as easy in the reception-room as at the jeweller's counter. The receptionist who wishes to earn a good salary or commission could do worse than to take a course of salesmanship at one of the many business training centres which now exist in most large towns.

* * *

Muddy Prints. With hypo at the present price there is danger of an inclination to overwork the fixing-bath before transferring it to the residues. Theoretically, hypo will dissolve a much greater quantity of silver than is desirable it should do before it is discarded, for it is not only saturation with silver which is to be avoided, but the introduction of other matter which causes trouble. Now that bromide and gaslight papers are used so extensively the fixing-bath sometimes becomes loaded with developer and a degradation of the high-lights gradually appears as a consequence. Many printers transfer their prints direct from the developer to the hypo without rinsing, and at the end of a day's work the fixing-bath contains a pint or more of amidol or metol-hydroquinone solution. If this were poured in in one dose one would throw away the solution and make a fresh one, but the effect is the same if it is added a drachm at a time. This is often not recognised until the mischief is done, and dirty-looking prints are coming through. If a printer starts with, say, twenty ounces of developer and finishes with only ten ounces in his dish, the balance must be somewhere, and if the prints are not well rinsed, it is in the fixing-bath. If a plain solution of hypo be used the contamination soon becomes visible, but with the acid bath now generally used the danger point is often long passed before it is recognised. Economy in hypo is too dearly attained at the cost of inferior prints. Another point which many printers are not careful over is the contamination of the developer by hypo carried into it by the fingers. The gelatino-chloride worker had perforce to keep the hypo solution in its proper place, but there is now arising a generation to whom it has no terrors because its evil influences are not so immediately apparent.

* * *

Knifing Bromides. Not so long ago the retoucher who could use the knife effectively upon a negative was the exception, but now every practitioner of any pretensions is presumed to be an expert in this direction. The print finisher has not adopted the knife to the same extent, yet it is easier to work upon a matt-surface bromide than it is upon a negative. The procedure is very similar in

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SUMMARY.

A recent paper before the New York Society of Illuminating Engineers has dealt with the design of optical systems for the projection of ordinary lantern slides or for moving-picture film. The author, Mr. J. A. Orange, discusses alternative schemes, representing systems which vary according to the size of the light-source, description of condenser, and aperture of projection lens. (P. 51.)

Apropos of our recent reply to a correspondent as to the avoidance of air-bells in tank development, the Eagle Tank Co. prescribes rinsing plates before placing in the developer and, further, removing surface air-bubbles from the developing solution before inserting the rack of plates. (P. 58.)

In efforts to economise hypo, quality of prints may suffer as the result of carrying developer into the hypo bath. The old practice of rinsing prints between developing and fixing appears now to be much less common. (P. 50.)

Excessive temperature of developer is often an unrecognised cause of flatness of gradation in portrait negatives. Not infrequently it creeps in as the result of over-warming the developing solution in cold weather. (P. 49.)

Photographs showing the part taken in the war by the City of Birmingham are now being collected by a photographic sub-committee of the War Memorial Museum. (P. 57.)

Our speculation of last week, as regards conditions under which American photographs secure copyright protection in this country, is contradicted by the terms of an Order in Council issued as long ago as 1915. Mr. R. Wallace, of the Scottish Photo-Pictorial Circle, calls our attention to this Order in a letter on page 59. The full text of the Order will be found on page 53.

"Colour Photography" Supplement.

In a recent paper before the Royal Photographic Society Mr. A. J. Bull dealt with some interesting phenomena of absorption and transmission of colour by various media, and instanced the effects which peculiarities of absorption or transmission produced in the photography of coloured objects. (P. 5.)

The current instalment of the "Decennia Practica" of colour photography takes the form of a résumé of the methods and formulæ which have been recommended and practised for the extra-colour sensitising of Autochrome plates. It is to be noted that these (pre-war) formulæ prescribe enemy dyes now largely replaced by British. (P. 6.)

The Prizma process of colour cinematography, described some months ago in the "Supplement," appears now to have been simplified to a form in which it differs very slightly from previous processes planned upon the same system. (P. 8.)

each case. The gelatine film must be absolutely dry. so that the portion of the image to be removed comes away in powder; the knife must have a razor-like edge, which must be kept at right angles to the paper, and the scraping must be done very gently, so as to avoid chipping off the coating. A knife skilfully used is to be preferred to any method of using abrasive powder or erasing rubber as is often recommended, as the work can be kept closer to the outlines of the subject and the surface is less disturbed. We have seen a skilful finisher by this method work up a dark enlargement using an ordinary penknife, clearing up heavy shadows and introducing lights in a way which appeared marvellous to the uninitiated. A great advantage over touching with body colour is that, as nothing is added to the original image, there is no change of colour even if the print fades slightly. It should be remembered that scraping is the most effective way of lightening aerographed work which cannot be cleanly removed with water.

SCIENTIFIC DESIGN IN OPTICAL PROJECTION.

A week or two ago we quoted from a paper before the New York Society of Illuminating Engineers on a system of regulating illumination upon the projection screen in accordance with the conditions which make for the optical comfort of an audience. A further paper before the same Society now deals with a subject which has a much more important bearing upon optical projection inasmuch as it is an investigation. as regards effective illumination of the projection screen. of different systems of illuminating the lantern slide or other transparency. The author, Mr. J. A. Orange. of the General Electric Company, is presumably interested in showing the superior results which can be secured by means of some metallic filament lamps used in accordance with an optical system which is quite different from that hitherto employed for other light-sources. such as gas mantles, Nernst, and arc lamps. But as it appears that the use of a metallic filament lamp for optical projection is being actively developed and promises to revolutionise the construction of optical lanterns, a study of the principles of projection as set forth by the author is certainly to be recommended to those who, after the war, will be returning to the manufacture of these largely sold articles. The metallic filament lamp has much to recommend it on the score of convenience and constancy in comparison with an arc, and if it turns out that its introduction for projection purposes is the occasion of displacing the familiar type of lantern condenser from the vogue it has enjoyed for many years past, it is obviously necessary that constructors in this country should keep before them what progress is being made in this direction.—Eds. B.J.

As a preliminary to the discussion of the magic-lantern and moving-picture projector it is convenient to consider the question of the most suitable brightness of the picture shown on the screen.

This matter has never been standardised, although there does not seem to be any particular obstacle in the way of some agreement as to the most desirable brightness in the heaviest shadows of a picture, expressed as a function of the general room illumination. A combination of experiment with tests on theatres should settle this point, but the connection between such brightness and the intensity of illumination provided by the projector (measured in the natural way with slide or film out) is the source of much difficulty.

The relation rests on two factors, one the density of the slide or film and the other the nature of the screen. The former is very variable even in the regular photographic product, while the various natural-colour achievements may run into appalling densities. The most that can be done at this time is to agitate for a standard density in the ordinary photographic records, there being little excuse for the extremes now run to. The dyed slides and films, moonlight and fire-light effects, are not a disturbing feature because gloominess is there part of the effect sought. The natural-colour products require a higher order of illumination and should be specially provided for unless the exhibitor can contrive to negotiate them by recourse to such expedients as further darkening of the room. shortening of the throw and substitution of a highly selective screen.

The remaining consideration, screen character, is the one determining the relation between intensity of illumination and screen brightness, slide or film being absent.

Taking the white paint or muslin screen as a standard, the metallic or selective screens offer a factor[1] of from 1 to 7 as regards picture brightness, and where the design of the auditorium is appropriate they are very desirable. Taylor[2] speaks of satisfactory slide projection with ½-ft. candle (5½ metre-candles) in the clear parts, presumably with a muslin or white paint screen. H. P. Gage, in the discussion on the same paper, gives some figures which seem to suggest 2.5 to 6.0 foot-candles (27 to 65 metre-candles) for magic-lanterns and 2.5 to 30 foot-candles (27 to 320 metre-candles) for moving pictures, again presumably on a matt white screen.

Regarding these figures it is interesting to note that a great many theatres operate successfully with less than 2.5 foot-candles (27 metre-candles) on a plain screen and that one of the best known theatres in the country is operating under conditions equivalent to considerably less than 10 foot-candles (107 metre-candles) on a plain screen.

The report of the Committee on Glare[3], dealing with screens, suggests a mean picture brightness of ½ Lambert (presumably milli-lambert), with a factor of 5 either way.

This mean value corresponds roughly with 2.5 foot candles (27 metre-candles) on a white paint screen, measured with slide or film out.

There is excellent reason for assigning an upper limit to the picture brightness in the case of moving pictures; this point will be referred to later.

In its typical form the magic-lantern is an instrument adapted to the projection of transparencies-slides about 10 cm. in diameter. At different stages in its history it has been used successfully with such enormously different light-sources as the kerosene flame. the lime-light and the carbon arc. Even when allowance has been made for the transparency of the old-time slides and the smaller screens of early days, it still remains a wonder that such different sources should have served the purpose.

For the projection of the slide there is used an objective lens system somewhat similar to a camera lens. One can say immediately that the highest possible illumination is produced if one can contrive an extended background of source-surface behind the slide (Fig. 1*a*). In this ideal case the illumination at the screen, the slide being absent, is $\frac{A \times B}{r^2} \times k$ where A is the apparent area of objective opening

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(1) Committee on Glare, "Diffusing Media Projection and Focussing Screens." Trans. I. E. S., p. 92, No. 1, vol. XI.

(2) Taylor, J. B., "The Projecting Lantern." Trans I. E. S., p. 414, No. 3, vol. XI.

(4) Committee on Glare, "Diffusing Media: Projection and Focussing Screens." Trans. I. E. S., p. 92, No. 1, vol. XI.

presented toward the particular screen-point considered, B is the brilliancy of the source, x is the throw and k is the transmission coefficient of the objective. (As in the case of the searchlight the optical system presents an area endowed with the brightness of the source, neglecting objective losses, and the area, the brightness and the remoteness determine the illumination at the point in question.)

If it were not highly uneconomical and inconvenient in many ways this arrangement would be the natural form of magic-lantern. In practice it is usual to use, not a background of source-surface behind the slide, but a background of lens-surface. Now, if there is an extended source-surface behind this lens—and at any distance, provided the source is indefinitely extended—then the lens-surface will appear as bright as the original source, neglecting reflection and absorption losses. If the lens is convex, there can be found one particular position for the source-surface at which a relatively small extent of source is completely sufficient. The result is a screen illumination $\frac{A \times B}{x^2} \times k_1, k_2$, where k_1 is the coefficient of transmission of the [*condenser*] lens—again simply a matter of absorption, etc.—and k_2 is that of the objective.

The lens which serves in this way is known as a condenser. There is a simple way of demonstrating the possibilities of a condenser, viz., by sending light backwards from the front of the objective, the latter being temporarily covered with a piece of ground glass. By holding a piece of paper behind the condenser one may explore the possible source positions; a circular patch of light is noticed which varies greatly in size with the distance from the condenser, and the size of this patch indicates the maximum extent of source which is useful in the corresponding position, any further extension of source-surface being without effect (Fig. 1*b*). Any piece of glass which is free from flaws and is of a generally convex form will function as a condenser, but it is another matter to design a condenser which will facilitate the use of an extremely small extent of light-source.

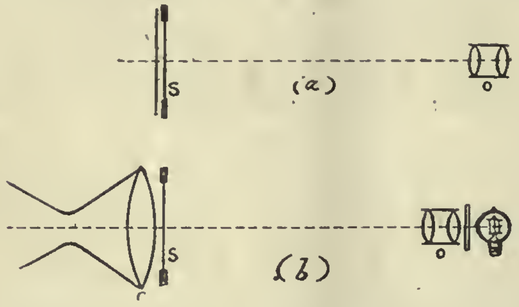


Fig. 1.—(*a*). Extended background of light-source behind transparency without condenser. (*b*) Smaller light-source with use of condenser behind transparency.

Standard practice involves the use of a pair of plano-convex [*condenser*] lenses; in any particular case there is a limit to the degree of convexity which it is advisable to use, since it will be found that the more extreme forms call for a greater extent of source. A much better result is obtainable if one can use non-spherical surfaces for the condenser, the sharpest curvature being near the axis. The difficulty of producing such surfaces commercially has restricted this development until very recently.

The limit of design on specially corrected condenser systems is really determined by the lens losses which increase more and more as the design (in effect, the number and convexity of the lenses) becomes extreme.

The magic-lantern in this form is a relatively simple instrument. Rational design runs somewhat as follows:—Knowing the size of slide and the average throw and screen size for which the outfit is intended, the focal length of the objective is fixed. Selecting some standard of illumination which the apparatus shall attain, making due allowance for the conditions under which it is likely to be used—such as degree of general illumination and screen factor—there is next to be considered the means adapted to that end.

The expression for the illumination, $\frac{A\ B}{x_2}\ k$ involves area of objective opening and brilliancy of source, throw and coefficient of transmission (this latter covering both objective and condenser). The two latter quantities are known roughly, so that one is left with a simple relation between objective opening and source brilliancy. The brilliancies of light-sources are extremely different, as has already been remarked, and it follows that the size of the objective opening required will vary greatly. Attempts to use light-sources of very low brilliancy encounter the difficulty that extreme "aperture" in the objective is expensive *and is subject to a fairly definite limit consistent with satisfactory definition in the projected picture.* This applies particularly to oil, coal-gas, and acetylene flames and the Welsbach lamp. There is a big gain in source brilliancy in going to the lime-light and Nernst lamp. The corresponding requirement in objective aperture is quite moderate, and, in fact, it is not so much their optical character as it is general inconvenience which has limited the application of those sources.

The result is that the source which has been most commonly used until recently is the carbon arc. Here we have something which far transcends even the lime-light and Nernst lamp in brilliancy and the size of objective opening needed is very small. In consequence of this the arc lantern, as generally used, is contrived a little differently from the instrument so far discussed.

A certain small aperture will suffice for the objective, and with the best choice of plano-convex condensers a certain size of source is then required.

Now it follows from the existence of marked spherical and chromatic aberration in the condenser that one may with advantage use an objective which is larger than is really necessary, but at the same time arranging so that each screen point is served only by a small portion of the objective. Perhaps this device is more readily understood from a numerical example. Suppose that on the basis of arc brilliancies it is concluded that 1 sq. cm. of objective opening is ample. If one were to provide an objective with that amount of opening and then add the most suitable form of plano-convex condenser it might be necessary to use an arc-crater 15 mm. in diameter. On the other hand, it would be possible to use an objective 16 sq. cm. in area, of which only 1 sq. cm. would be utilised by any particular screen-point; this might be attained with perhaps only 10 mm. arc-crater, using the same condenser arrangement. This alternative arrangement is the one corresponding to the rule which is given in books on projection, namely, that the convergent beam coming from the condenser shall penetrate the objective so that no part of the beam shall be obstructed by the lens mounts, etc.

Another way of looking at magic lantern design for arc service is to consider that there are three ways of getting the desired results.

(1) Use a very small objective, an ordinary condenser and a large and expensive light-source (Fig. 2a).

(2) Use the small objective, an expensive condenser and a small, cheap light-source (Fig. 2b).

(3) Use an objective which has a gross aperture in excess of the "effective" aperture for any field-point, a cheap condenser and a small, cheap light-source (Fig. 2c).

The choice is one that turns on relative costs of apparatus and rests with the maker; the third alternative is out of the question with sources of low brilliancy since difficulty and expense are encountered in attaining even the effective aperture they require, let alone anything larger.

Recently the tendency has been to substitute a tungsten lamp for the arc, and it is evident that this is sound practice. The tungsten lamp in its various special forms offers a brilliancy ranging from a value higher than that of the Nernst lamp up to a value exceeding one-quarter of that of the direct current arc-crater. There is no difficulty in getting ample objective aperture for use in conjunction with such a source, but it ought to be remarked that erroneous conclusions may be drawn from tests in which an outfit designed for the arc is made to work with tho incandescent lamp.

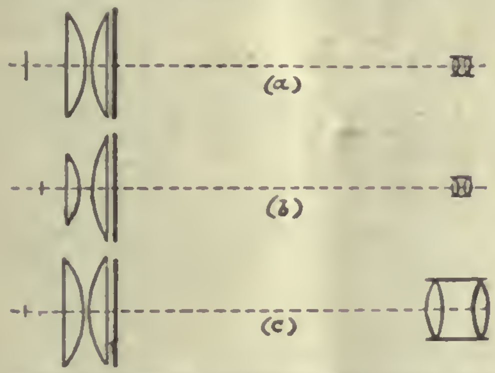


Fig 2. -Alternative Arc Lantern Arrangements. (a) Objective small condenser cheap, source large. (b) Objective small, condenser corrected, source small. (c) Objective large, condenser cheap, source small.

To sum up: the old illuminants (acetylene, mantle lamps, etc.) have such a low brilliancy that in order to get good results expensive optical apparatus is necessary, and even then the possibilities are limited. Between these illuminants and the more recent there is a gain in brilliancy of from 100 to 1,000 fold. This enormous gain renders it easy to provide optical equipment which will yield any results likely to be needed. Questions of convenience then come to the fore, and there is no doubt that the tungsten lamp is in much the strongest position in the group (lime-light, Nernst lamp, tungsten lamp, carbon arc). J. A. ORANGE.

(To be continued.)

COPYRIGHT OF AMERICAN PHOTOGRAPHS IN GREAT BRITAIN AND CERTAIN BRITISH POSSESSIONS.

IN order thoroughly to clear up the misinterpretation contained in the last paragraph of the article on "Copyright in British Photographs in the United States, and in American Photographs in Great Britain," which appeared in the "B.J." of January 25 last, we reprint here the text of the Order in Council of February 3, 1915, by which the conditions on which American citizens secure copyright in this country are definitely formulated. It will be seen that the whole substance of the Order is contained in Sub-Sections i. and ii. of Section I.—namely, to the effect that photographs secure copyright here for a term which shall not exceed that conferred by the Copyright Law of the United States, and, further, that American citizens, as a condition to securing copyright here, require to observe the formalities prescribed by the United States law. These are chiefly the registration of photographs at Washington and the marking of published copies "copyright."

At the Court at *Buckingham Palace* the 3rd day of *February*, 1915

PRESENT.

The KING'S Most Excellent Majesty.
Lord President.
Viscount Knollys.
Lord Chamberlain.
Mr. Secretary Harcourt
Mr. Arthur Henderson.
Sir William MacGregor
Lord Justice Bankes.

WHEREAS by a Proclamation of the President of the United States of America, dated the 9th April, 1910, the benefits of the United States Act of 1909, entitled "An Act to Amend and Consolidate the Acts respecting Copyright," were extended to the Subjects of Great Britain and her Possessions, but no provision was made therein for the protection of the musical works of British Subjects against reproduction by means of mechanical contrivances:

And whereas His Majesty is advised that the Government of the United States of America has undertaken, upon the issue of this Order, to grant such protection to the musical works of British Subjects:

And whereas by reason of these premises His Majesty is satisfied that the Government of the United States of America has made, or has undertaken to make, such provision as it is expedient to require for the protection of works entitled to Copyright under the provisions of Part I. of the Copyright Act, 1911:

And whereas by the Copyright Act, 1911, authority is conferred upon His Majesty to extend, by Order in Council, the protection of the said Act to certain classes of foreign works within any part of His Majesty's Dominions, other than self-governing Dominions, to which the said Act extends:

And whereas it is desirable to provide protection within the said Dominions for the unpublished works of Citizens of the United States of America:

NOW, THEREFORE, His Majesty, by and with the advice of His Privy Council, and by virtue of the authority conferred upon him by the Copyright Act, 1911, is pleased to order, and it is hereby ordered, as follows:—

1. The Copyright Act, 1911, including the provisions as to existing works, shall, subject to the provisions of the said Act and of this Order, apply—

(*a*) to literary, dramatic, musical and artistic works the authors whereof were at the time of the making of the works Citizens of the United States of America, in like manner as if the authors had been British Subjects:

(*b*) in respect of residence in the United States of America, in like manner as if such residence had been residence in the parts of His Majesty's Dominions to which the said Act extends.

Provided that—

(i) the term of Copyright within the parts of His Majesty's Dominions to which this Order applies shall not exceed that conferred by the law of the United States of America:

(ii) the enjoyment of the rights conferred by this Order shall be subject to the accomplishment of the conditions and formalities prescribed by the law of the United States of America:

(iii) in the application to existing works of the provisions of Section 24 of the Copyright Act, 1911, the commencement of this Order shall be substituted for the 26th July, 1910, in sub-section 1 (*b*).

2. This Order shall apply to all His Majesty's Dominions, Colonies and Possessions, with the exception of those hereinafter named, that is to say:—

The Dominion of Canada.
The Commonwealth of Australia.
The Dominion of New Zealand.
The Union of South Africa.
Newfoundland.

3. This Order shall come into operation on the 1st day of January, 1915, which day is in this Order referred to as the commencement of this Order.

And the Lords Commissioners of His Majesty's Treasury are to give the necessary orders accordingly.

Almeric FitzRoy.

CAPTAIN E. L. H. DUNKERTON, whose name figures in a recent list of military honours, is doubtless well-known to many of our readers as the son of Mr. T. Dunkerton, architectural and portrait photographer and view publisher, of 95, Portland Road, Hove. Captain Dunkerton, who has just been awarded the Military Cross, was before the war actively connected, almost from boyhood, with his father's business, and at the age of 17 successfully travelled Ireland in his interests. In 1915 he enlisted in the Artists' Rifles, was mentioned in dispatches in August last, and has now received the Military Cross for great gallantry under heavy enemy barrage fire. His age is now 22.

TRAINING IN APPLIED OPTICS.

American Plans to Develop an Optical Industry.

The first step in the encouragement and development of optical industry—viz., the training of men in the special scientific field of applied optics—is the subject of full recognition by Professor James P. C. Southall, of Columbia University, who, in the "Scientific American," recounts the steps taken in France and England, and impresses the necessity of similar measures being carried out in the United States. Professor Southall writes :—

Within the past year an Institute of Applied Optics has been established in France under the able directorship of Professor Charles Fabry, which is to include (1) a college of optics intended to provide a thorough theoretical training for opticians and at the same time to cultivate among its students a taste and zeal for optical research; (2) an optical laboratory for experimental and testing purposes; and (3) a trade school in optics with all the most modern methods and appliances. The courses of study are said to be already under way. The transactions of the institute will be published in a journal devoted to optical science. Meantime a similar project has been inaugurated in England by the establishment of a Department of Technical Optics at the Imperial College of Science and Technology in London. Professor F. J. Cheshire, president of the Optical Society of Great Britain, who has had large experience in optical matters, has been appointed director, and the courses of lectures have been advertised for the current academic session. The British Government and the London County Council have aided the enterprise with liberal grants.

It is not without significance that this long-delayed step in both France and England is in reality a direct consequence of the war. The importance of properly organised manufacturers of optical glass and of optical instruments had been manifest, and the matter had been frequently and insistently brought to the attention of the Governmental authorities, but until the dire necessities of war revealed the lack of optical preparedness little heed was paid to these representations. A writer in "Nature" (Vol. 99, August 2, 1917, p. 448), commenting on the situation, observes feelingly that "the thought of what range finders mean to the British Navy and of how narrowly we escaped being dependent upon the enemy for our supply of these essential instruments, is almost enough to make one shudder, even under the wings of a Royal Navy that has swept the sea." Some time ago a Board of Scientific Societies was organised in England by the Royal Society to investigate scientific and technological problems arising out of the war, and the first formal report to be issued by this body is entitled "National Instruction in Optics." The report, which was published in full in "Nature," March 1, 1917, and which is well worth reading, emphasises the necessity for immediate action, and asserts that "the next few years are the years which will determine the future of the (optical) industries of the country."

It goes without saying that the same reasons which have led to the establishment of these optical schools in France and England are equally applicable in the United States. If the optical industries are to be encouraged and developed among us, not only now but in the years to come after the war, there will be an increasing need of trained and experienced men with a more or less extensive acquaintance with the whole range of optics, both theoretical and applied. At present there is no university in this country where this special training can be acquired. In our colleges optics is studied merely as a part of physics and by students who have little or no concern with the manifold applications of optics in the arts and industries of the modern world. Not many of us pause to think of the aid which optics lends to the prosecution of scientific research in all its branches or its relation to the vital problems of human vision. In America as well as in England and in France optical science has had illustrious votaries whose work has become known all over the world; but notwithstanding, it has come to pass that the great domain of applied optics has in modern times become almost exclusively a German province, not because the Germans possessed superior skill and genius in optics, but because they realised the great practical importance and far-reaching influences of this territory and have assiduously cultivated it ever since the epoch of Fraunhofer, who is justly regarded in his own land as the father of scientific industry in Germany.

Already in the United States there are signs of an awakening to the needs of the situation. Under the auspices of the Optical Society of America a new scientific journal devoted exclusively to optical science in all its branches has recently made its appearance. This in itself is an achievement of good omen. Undoubtedly, there is growing up in this country a deeper appreciation of the desirability of closer co-ordination between science and industry. One of the lessons of the war—which would seem to be self-evident, but which needed to be driven home—is that the same science rules in the workshop as in the laboratory. This was the lesson that Fraunhofer taught his countrymen. Huxley said that what people call applied science is nothing but the application of pure science to particular problems.

Animated by such purposes and ideals and by the example of England and France, a scheme is on foot to establish in at least one of the large American universities courses of lectures and of laboratory training in the various branches of Applied Optics. It is proposed to include, for example, such studies as Geometrical and Physical Optics, Theory of Modern Optical Instruments, Lens Design and Lens Testing, Manufacture of Optical Glass, Refractometry, Polarimetry, Physiological Optics, Photometry and Illuminating Engineering, Interferometry, Spectrophotometry, Colorimetry, Optometry, etc. A certain portion of this work is already being done in Columbia University, and it is to be hoped that the authorities of that institution can be induced to undertake the larger programme indicated above. The graduate students would be recruited from various classes—Army and Navy officers, students or ex-students of the universities and technical colleges, astronomers, manufacturers of optical instruments, oculists, optometrists, etc. The ordinary period of study would probably be one year. Presumably the courses could be so arranged that a student with the necessary qualifications could obtain the degree of Master of Arts.

It is desirable to ascertain in advance whether there will be a sufficient domand for "optical engineering" in this country, because obviously this will be the first question that will be asked by a University Board of Trustees. The college authorities will wish to know how this project is viewed by the leaders of the optical industries themselves. It would seem that financial support ought not to be lacking.

Exhibitions.

PHOTOGRAPHS BY MR. J. B. B. WELLINGTON AT HAMPSHIRE HOUSE.

The Hammersmith Photographic Society is to be congratulated on having brought together a collection of the work, in pictorial photography, of Mr. Wellington, particularly as the prints upon the walls mark the progress of Mr. Wellington's aims from the early days of thirty years ago, when his metier was chiefly moaning eventides, to his most recent work in photography of the nude and by artificial light. Although the chief business of Mr. Wellington's life is the technicalities of manufacturing dry-plates and printing papers, photography has always remained a hobby which he has cherished with all the ardour of the real amateur. We have been told that it is only one of other hobbies, among which are gardening, engraving, cabinet-making, silversmith's work, and wood and metal turning. Mr. Wellington is fortunate in finding the opportunity for following these many crafts. His work as an amateur in photography has always had a strong appeal to us for its "straightness." It invariably embodies the qualities of detail and tonality which are the essential virtues of photography. In looking round an exhibition such as has been brought together at Hampshire House, we are at a loss to know which we admire the most—the earlier landscapes in long, quiet lines, the later, more vigorous landscape work, done largely in the Highlands or the more recent studies of children gracefully posed in the nude. However, the visitor to Hampshire House can traverse all three periods, and, perhaps, come to a decision according to his personal inclinations. The exhibition will remain open for the next two or three weeks.

Legal Notices.—A receiving order has been made on a creditor's petition against Stanley Ford Chapman, photographer, Bel Air, Irnham Road, Minehead, Somerset.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Multi-colour Copies of Plans.—No. 111,619 (April 12, 1917). The invention relates to the copying of coloured plans, drawings, etc., the object being to produce sharp and well defined representations of drawings, tracings, and the like in several colours at one operation.

In the well-known process termed "Ordoverax," by which good black-line prints are produced, a ferro-prussiate print is first taken from the tracing, this, whilst undeveloped, is placed in contact with a suitably prepared gelatine surface. The undeveloped lines of the blue print exert a chemical reaction on the gelatine, so that such lines take up greasy ink from a roller, whereas the ground remains clear. From this surface copies in black lines on a white ground can be pulled. A coloured ink can of course be used, but the prints must be in one colour only. Another method of working on the gelatine is to draw the original in "actinic ink"—that is, an ink containing chemicals which have an effect equal to that of the unexposed lines of a blue print, which etches the gelatine, no photographic exposure being necessary.

There is another process in use, known as the "Hectograph" process, which consists of writing an original (usually of small dimensions) in aniline dyes of one or various colours; when dry this copy is placed on a suitably prepared gelatine surface which absorbs a portion of the dye, and when clean paper is rubbed down on this surface, an impression of the drawing is obtained. A number of such impressions can be taken, but each becomes fainter than the last owing to the exhaustion of the dye. Moreover, the outline can never be obtained in a good, sharp, black line, and owing to the nature of the composition and the difficulty of drawing originals in aniline dye large size copies are seldom taken, the process being confined almost exclusively to hand sketches and manuscripts.

The object of the invention is to overcome these difficulties by combining the two processes in such manner as to obtain good prints in several colours, from a tracing which possesses a sharp well-defined black or coloured outline of the work being copied, produced at one operation, thereby obviating the difficulty arising from faulty register, and in addition the restrictions as regards dimensions, very large prints, in one sheet without joints being easily printed.

A colloidal compound is prepared, which embodies the essential properties of the "Ordoverax" and "Hectograph" compositions before referred to. A suitable composition for all processes is—gelatine 20 parts, water 60 parts, and ferrous sulphate 1 part, so that the lines of an exposed but undeveloped blue print will exercise a catalytic action on the surface and cause printers' ink to adhere wherever these lines have touched; the ground remaining ink free. In addition the colloidal compound will absorb inks of aniline dye, and will yield copies by pressing clean paper upon such absorbed dye.

Having run this colloidal compound on a suitable surface there is placed thereon an exposed but undeveloped blue print taken from the tracing to be copied. On removal the lines are inked up, and then upon the gelatine surface the work is coloured in suitable aniline dyes. The black or coloured outline from the original drawing can be inked up for every impression, the dye will yield the colour without inking, and a number of good impressions are easily obtained.

As an alternative, in some cases the blue print can be coloured before being placed on the gelatine, the colouring being transferred thence to the gelatine. Or the original may be drawn in "actinic ink" and coloured before being placed on the gelatine, the colouring being similarly transferred to the gelatine. Or an outline drawn in "actinic ink" can be placed on the gelatine and subsequently coloured thereon. Or the lines of an old blue print can be drawn over in "actinic ink" and the print then placed on the gelatine, the colouring being either placed on the print or direct on to the gelatine. All these variations are possible and requisite to suit special work, but all embody the two processes which produce a print in several colours by one operation at a fraction of the cost and in a fraction of the time of the processes at present in use.

In the event of a large number of copies being required, and to save further photo-printing or drawing, a pull in black line can be obtained on paper, and whilst the lines are moist they can be dusted over with "actinic transfer powder"—that is, a powder which has the same effect as "actinic ink." This paper copy is then transferred to a new colloidal surface, which it will etch ready for inking, and it can either be coloured in aniline before transfer, or the colloidal surface subsequently coloured.—Benjamin James Hall, "Fieldend," Eastcote, Middlesex.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Hydronix.—No. 380,786. Photographic developers (chemical). White Band Manufacturing Co., Ltd., 121, Selsdon Road. South Croydon, Surrey, manufacturing chemists. November 27, 1917.

V. B. D. Plex (Design).—No. 380,095. Photographic prints. Vincent, Brooks, Day, and Son, Ltd., 48, Parker Street, Kingsway, London, W.C.2, lithographers. October 10, 1917.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

Mysto.—No. 379,755. Chemical substances used in photography. Bernadette Chaloult Clément, 19, Sicilian Avenue, London, W.C.1, manufacturing chemist.

Analecta.

Extracts from our weekly and monthly contemporaries.

Developer for Bromides.

Although it is possible to reduce staining of the paper to a minimum (writes Mr. David Ireland in the "Amateur Photographer" for January 23), by the liberal use of preservative, the colour of the resulting prints is still a more or less cold black, so that no compensation is obtained for the extra trouble and the risk of spoiled material.

Sodium acetate, the writer finds, has the property of producing the exact tone he has had in view, and the formula given below provides a clean-working developer, staining neither paper nor fingers, the time required for development being four to five minutes.

Sodium carbonate	220 grs.
Sodium sulphite	120 ,,
Sodium acetate	70 ,,
Potassium bromide	5 ,,
Acid sulphite solution	5 drs.
Water	4 ozs.

To 4 drs. of this solution add 5 grs. dry pyro, and make up to 2 ozs. with water; tap water is all that is required, the developer having only a faint discolouration after use, and even this may be avoided by the use of well-boiled water. Give the tray an occasional gentle rock; do not agitate the developer unnecessarily; the image appears in about one minute, and continues to gain in strength with great smoothness; no loss of density occurs in the fixing bath, so that the print is removed as soon as the desired strength has been reached: wash a couple of minutes in running water, and fix in:

Hypo	2 ozs.
Water	10 ozs.
Acid sulphite solution	½ oz.

Presumably pyrogallic acid in the form of crystals will be employed, and 5 grains will be two lifts of a threepenny bit held edgewise between finger and thumb.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, February 2.

Stalybridge Photographic and Scientific Society. "Amateur Photographer" Prize Slides.
Rodley and District Photographic Society. Annual Exhibition and Social.

Monday, February 4.

South London Photographic Society. "Round the Mediterranean." Dr. C. Atkin Swan F.R.P.S.
Dewsbury Photographic Society. "Framing Pictures." F. Hoyle.
City of London and Cripplegate Photographic Society. "Mounting Prints and Passe Partout Framing." N. F. Horne.
Bradford Photographic Society. Principles of Art Applied to Photography." A. Keighley.

Tuesday, February 5.

Royal Photographic Society. "The Relations Between Optical Intensity and Quantity of Deposit in Prints." F. F. Renwick.
Birmingham Photographic Society. "Norway: a Peep at its Folks and Fiords." F. W. Pilditch.
Hanley Photographic Society, Y.M.C.A. War on Land. National War Savings' Committee Lecture.
Sheffield Photographic Society. Exhibition of Prints by the Cardiff Photographic Society and Yorkshire Photographic Union.
Keighley and District Photographic Association. Coffee Supper.
Monklands Photographic Society. Scottish Federation Prize Slides.
Hackney Photographic Society. Slides by members.

Wednesday, February 6.

Croydon Camera Club. "Travellers' Samples gathered by Motor and Camera." F. Ackroyd.
Photo-Micrographic Society. Members' Evening.
Edinburgh Photographic Society. "The Development of the Cinematograph." T. Haddow.

Thursday, February 7.

Hull Photographic Society. Y.P.U. Slides.
Huddersfield Naturalist and Photographic Society. "Lantern Lecture." L. S. Cocking.
Leigh Photographic Society. "Amateur Photographer." Prize Drawing.
Liverpool Amateur Photographic Association. "Happy Japan." H. G. Allen.
Hammersmith (Hampshire House) Photographic Society. "Oil Printing and Transferring." F. G. Coupland.
Rodley and District Photographic Society, Members' Night.

ROYAL PHOTOGRAPHIC SOCIETY.

A Lantern lecture "In the Alps with a Camera" was to have been delivered on Tuesday evening last by Dr. C. Atkin Swan. In consequence of the lecturer's summons at short notice to hospital duty in connection with air-raids the meeting had to be abandoned.

CROYDON CAMERA CLUB.

Mr. W. H. Smith, technical manager of the works of the Platinotype Co., was announced to give "an exhaustive demonstration of Satista printing paper, but at the outset said he did not intend giving an exposition of stereotyped character, but proposed coating and drying a few pieces of paper, and making some prints by the aid of a half-watt lamp, which was much in evidence on the table. As usual, he was accompanied by his "beauty chorus," in the shape of gorgeous prints of extremely fair young ladies from negatives taken by foremost professional photographers.

There is no secret, he said, in the preparation of Satista paper, as the process is patented, even if the same remark cannot be applied to the special methods employed in machine coating to ensure uniformity and fine-quality prints. The chemical reactions involved are very beautiful—more so, perhaps, than with platinotype, though those connected with palladiotype are equally interesting. As regards the last, another brand rendering a black image of platinotype quality and permanence will shortly be on the market. Some prints in the new paper were much admired, and appeared to be indistinguishable from platinotypes.

A Satista print, as most are aware, bears an image of silver and platinum, the high-light detail being composed of platinum, the shadows taking up more and more silver as their depth increases. By taking a sheet of ordinary P.O.P., which has been kept away from white light, and immersing it in a solution of salt to convert the "free silver" into chloride, after washing and drying it in yellow light, a slow gaslight paper is obtained, though an indifferent substitute for the regular article. If such paper, or preferably a commercial gaslight paper, is coated with a solution of ferric oxalate, then, after exposure to daylight or powerful artificial illuminant, it is feasible to develop it in the same way as a platinum print—namely, on a solution of potassium oxalate. Incidentally, a gaslight paper coated with potassium oxalate solution is converted into P.O.P., which, if kept fairly dry, will remain in good condition for years. In answer to a question, Mr. Smith said a 10 per cent. solution will be about right, but in strictness this should be adjusted to the silver present—rather an unknown quantity with gaslight papers.

He then coated a piece of unprepared paper with a solution of ferric oxalate (exact strength immaterial for demonstration purposes), to which 1-50th grain of potassium chloroplatinite per ounce had been added. He rapidly dried the paper in front of a gas-stove, and exposed it behind a negative for 2½ minutes close under the 2,000 c.p. half-watt lamp. On development in a normal "platinotype" oxalate developer only a suspicion of the shadows appeared. Omitting the platinum salt, he next repeated the foregoing procedure with a piece of paper coated with silver chloride (previously coated and dried to save time). A gaslight paper will form a sufficiently satisfactory substitute. Here, a full-strength picture finally resulted, quite good in its way, but the blacks were of brownish hue and the high-lights somewhat veiled and degraded. In the third experiment the same procedure was adopted as in the second, except that this time the 1-50th grain per ounce of the platinum salt was added to the sensitising solution. The blacks in the developed Satista prints were intense and of good quality, and the high-lights cleaned up without loss in modelling. Although the merest trace of platinum salt is required for the reaction, in practice sufficient is employed to ensure an absolutely permanent image, containing all details of the picture.

It should not be overlooked that in the second experiment the high-lights were composed of silver, in the third experiment of silver and platinum, and in the commercial paper they would be represented entirely by the rarer metal. This illustrates the complex way in which the platinum salt reacts on the silver salt and the silver salt on the platinum, possibly on the principle that "one good turn deserves another," though this scientific theory, in fairness, must not be attributed to Mr. Smith.

The "spreader" used by him for distributing the sensitiser met with much approval, and, watching him, it appeared to be the simplest operation in the world to hand-coat paper evenly, always provided one is possessed of the sub-conscious knowledge born of practice, which in the present case can be loosely designated as "knack." The quickly-made substitute for a Blanchard brush is a very simple affair. It consists of a piece of swansdown about 3 inches square, doubled over twice, and clipped in an ordinary penny letter-clip of the "bull-dog" type. A fresh surface after use can be obtained by folding the other way. The lecturer had experienced no trouble on account of the metal, as with swansdown any creeping-up action of the solution is of negligible quantity. A dozen or more sheets may be coated before replacing the material.

In the discussion, Mr. H. M. Bennett enquired if the paper used had a right and a wrong side. "Certainly," was the reply. "Which side do you coat?" continued the questioner. "The right side," said Mr. Smith, pleasantly. Mr. C. Welborne Piper suggested an osmium printing process on the lines of palladiotype, but, unfortunately, gave insufficient details to enable its manufacture to be undertaken with any certainty of success. On the co-operative principle the thing should go with a swing. "Every man his own Osmium," so to speak. A hearty vote of thanks was accorded Mr. Smith for an altogether excellent demonstration, one sufficiently novel to tickle the most jaded photographic appetite. Jaded appetites in other directions, by the way, are becoming somewhat rare.

News and Notes.

Messrs. J. H. Dallmeyer, Ltd., of Church End Works, High Road, Willesden, N.W.10, advise us that owing to still further advances in the cost of raw material and labour they are compelled to increase the list price of their lenses and apparatus a further 5 per cent., making 20 per cent. in all, this advance to date from and including February 1, 1918.

The Late Mr. C. T. Chesterman.—We are sorry to see the note in "Process Work" of the death of an old reader and occasional correspondent of the "B.J.," Mr. C. T. Chesterman, an English lithographer and process man, who resided for over thirty years in Petrograd, being employed in one of the Government printing departments. He was a man with an immense fund of useful information on all matters concerning printing, engraving, and process work.

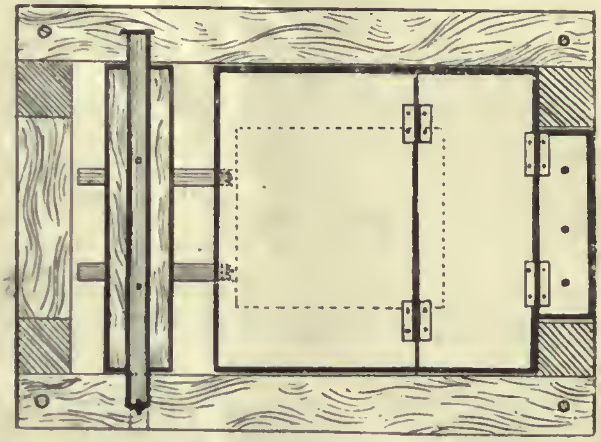
Snowden Ward Memorial Fund.—The London Hospital, Whitechapel, reports with regard to this fund that the capital remains in the original securities at £153.

The accumulated income, including £7 0s. 5d., last year's dividend, is now £52 19s. So far there has been no call on these funds, which are available for *assistance to any needy photographer* who is an in or out patient of the hospital. Such assistance may take any form approved by the Lady Almoners: the provision of nourishing food, support at convalescent homes, surgical instruments, or money grants—assistance not available from the ordinary funds of the hospital. The house governor of the hospital points out that the great development of photography in the Army may well mean in the future that there will be cases needing assistance, when the fund would be of the greatest value.

Vanguard Frictol.—The Vanguard Manufacturing Company, Maidenhead, send us a sample of their abrasive paste issued under the name of "Frictol," and now put up in a somewhat more solid form, and in flat tins, in which it can be handled without fear of leakage. The preparation, as we have proved for ourselves by a trial of it, preserves all the good qualities of the original form. It is an exceedingly smooth paste, with just sufficient abrasive quality to fit it for the rapid rubbing down of dense patches on negatives and prints when applied with a bit of rag stretched over the finger-tip, or, for finer work, over a blunt stylus. The abrasive action is smooth and regular, and evidently the preparation is made with the utmost care for the avoidance of particles of grit which would ruin it for its special purposes. The shilling tin (post free, 1s. 3d.) will last a photographer for years in the treatment of considerable numbers of negatives or prints, and on occasion may be usefully pressed into service for removing tarnish from such surfaces of metal which do not yield quickly to the ordinary liquid metal polishes.

Photographs for Birmingham War Museum.—The Photographic Sub-Committee of the Birmingham War Museum movement are anxious to get into immediate touch with all photographers (professional and amateur) who possess negatives illustrating the great part the city has played in the war, with the object of obtaining a permanent collection of prints for preservation as a record and memento for future reference and study. The collection of prints will be mounted, arranged, and catalogued by the sub-committee on the lines followed so successfully by the Warwickshire Sorvey. The prints should be made by some permanent process (carbon, platinotype, bromide, preferably toned). In cases where photographers are unable to supply prints the negatives may be lent, or will be accepted as a gift. A full description of the pictures should be sent, with the names of any prominent persons appearing in the scenes depicted. The photographs required to render the collection complete will necessarily cover a wide area, and will include work in munition factories, women's work in the war, as well as entertainments for the wounded. Lists and all communications should be sent to the hon. secretary, Mr. George Whitehouse, Photographic Sub-Committee, War Memorial Museum, Art Gallery, Birmingham.

Gaslight Printing from Amateurs' Negatives.—In making up the article by Mr. D. Charles last week for the press, the inclusion of an additional drawing (fig. 4) of the extemporised printing frame for gaslight printing was, by an oversight, overlooked. The plan representation of the frame is now here printed, and will serve to supplement the details of construction given by Mr. Charles on p. 43 of the "B.J." of January 25.



Bromide Paper in X-Ray Work.—A contributor to the "Photo Revue," M. F. Javaugues, describing himself as a military radiographer, states that, on account of the greatly increased cost of plates, tests have been made of the possibility of using the ordinary bromide papers in X-ray work, and that very good results are being obtained by direct exposure to the X-rays. It is stated that with plates and papers bearing emulsion of the same rapidity, papers require an exposure of from one-third to one-quarter in order to yield a strong negative image by reflected light. The Lumière C. paper regularly used by the French Public Health Department requires fifteen times the exposure of the Lumière C. plates, but by means of the new Caplain screen this time of exposure can be reduced to one-twentieth. In the case of the Lumière C.R., L.R., and E.R., rapid bromide papers as supplied for enlarging, excellent results have been obtained with exposures approximately the same as those for X-ray plates. Good results have also been obtained with Mazo paper at exposures of about half a second. The foregoing papers have not been found suitable for the making of positive prints from the negatives obtained on them, but with the negative paper of Guilleminot either positive or negative prints can be made with exposures about one-third those of the Lumière X-ray plates or X-ray negatives produced at about the same exposure. From such negatives positive prints may be taken or the negatives themselves examined by transmitted light. It is found practicable, according to the character of the emulsion and the time of exposure, to obtain hardness or softness in the results, and at the same time a rendering of detail and range of tones which, while not equal to the results on plates, are sufficient in a large majority of cases.

Serteka in Sulphide Toning.—A short time ago we made reference to the valuable properties of Serteka when used with amidol, which it transforms, in some apparently magical fashion, into a developer with great lasting properties. The maker, Mr. G. W. Secretan, of 210a, Tufnell Park Road, London, N.7, has now issued a fresh circular in which he draws attention to the properties of Serteka when used in the sulphide-toning process. We have before pointed out that bromides developed with amidol and Serteka give very excellent tones, but the new instructions prescribe adding Serteka to the bleacher, and to the sulphide bath, as well as to the developer. We are told to add thirty drops of Serteka to 10 ozs. of bleacher, and 1 dram to 10 ozs. of sulphide bath. We used thirty drops in the one case and sixty in the other, and tested the effect. The result was a slightly lighter and warmer brown than that produced by toning without Serteka. On further trial we found that the effect seemed to be produced entirely by the Serteka in the sulphide, and we could not detect any difference as the result of adding it to the bleacher, which was the usual one of ferricyanide and bromide. Apparently the instructions might be simplified in this respect. The change in tones is a distinct one, but it so happened that the prints used gave an exceedingly fine tone without Serteka, so that the new tone was hardly an improvement. Tone is, however, more or less a matter of taste, and Serteka would no doubt effect a great improvement in the case of prints tending to give too cold a tone, while it should also have uses in the case of heavy prints that require lightening. One claim of the maker is that it gives pure whites. The whites were not stained in our prints, though no pure white existed; therefore we could not test its effects as regards stained whites. We can, in fact, detect no change in the whites, though the colour generally has changed very distinctly.

U.S. Anti-Trust Actions Postponed.—Messages from Washington to the "Rochester Herald" of January 3 report that Federal suits to dissolve seven so-called "trusts" have been postponed, at the solicitation of the United States Government. The Government gave as its reason that the dissolutions would require financial operations on a large scale if they are to be genuine and effective, and that Secretary of the Treasury McAdoo had asked that all money for new capital be left available to the nation.

Suits against the Eastman Kodak Company and five other corporations are all postponed until at least October next, the beginning of the next term of the Supreme Court.

The brief sent up by the Solicitor-General contains the reasons for the postponement in terse language. It follows:

"In order that the Government in this time of stress may not meet with competition from private enterprises in its financial operations and the flotation of its loans, the Treasury Department has been constrained to urge that all private financing on a large scale shall be avoided as far as possible. Thus, in his annual report on the finances for the fiscal year ending June 30, 1917, the Secretary of the Treasury makes the following observation:—

"'The Government must, if necessary, absorb the supply of new capital available for investment in the United States during the period of the war. This, in turn, makes it essential that unnecessary capital expenditures should be avoided in public and private enterprises.'

"It is quite clear that the dissolutions which are sought in the pending cases will require financial operations on a large scale if they are to be genuine and effective. Important as the remedy sought in these cases is believed to be, it must give place for the moment to the paramount needs of the hour."

The suit against the Eastman Kodak Company (adds the "Rochester Herald") is before the Supreme Court on an appeal by the defendants. The case is of long standing, having been instigated by Attorney-General Wickersham during the Taft Administration. When Mr. Wickersham's term of office had expired he had practically consented to a withdrawal of the suit after the company had agreed to alter certain selling practices which were alleged to be in violation of the Sherman Anti-Trust Law. When Attorney-General McReynolds, of the Wilson Administration, came into office he revived the suit, and it was brought to trial in Rochester and Buffalo before Judge John R. Hazel, who handed down a decision requiring Government and Eastman attorneys to devise a plan of reorganisation that would be acceptable to the Court. The attorneys failed to agree upon such a plan, and the defendant appealed to the Supreme Court.

◆

FORTHCOMING EXHIBITIONS.

February 2 to 9.—South Glasgow Camera Club. Secretary, John Baird, 164, King's Park Road, Cathcart, Glasgow.

February 9 to 16.—Glasgow and West of Scotland Amateur Photographic Association. Secretary, G. S. McVean, 125, West Regent Street, Glasgow.

February 21 to 23.—Leicester and Leicestershire Photographic Society. Sec., H. C. Cross, 80, Harrow Road, Leicester.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

⁂ *We do not undertake responsibility for the opinions expressed by our correspondents.*

AIR-BELLS IN TANK DEVELOPMENT.

To the Editors.

Gentlemen,—In last week's "B.J.," in your answers to correspondents, we notice an inquiry by "M. B." as to the cause of air-bells adhering to plates when developed in tanks. As we have had a lot of practical experience with large batches of plates during several years, may we suggest two causes of this trouble which are often overlooked. One is that some makes of very rapid plates have a rough surface, which easily carries air down into the solution. This may be overcome by passing the rack of plates quickly under the tap before putting them in tank, holding the rack at an angle to allow the water access to the surface of every plate.

Another, and *more common* cause, is bubbles on the surface of solution before putting rack of plates in tank. This is not often noticed in the dark room, especially in a deep, narrow tank, perhaps only two-thirds full. These are caused by hot and cold water from taps being run into developer. Also more often by stirring it up at last minute with thermometer or other article.

If any bubbles are on the surface, they must stick to plates, no matter how carefully put in. If none are there, and the plates lowered slowly, there will be none on plates.

We always draw a wide (width of tank) piece of cardboard across the surface before putting plates in, and this *always* prevents this trouble.—Yours truly,

Eagle Tank Co.

15b, Cank Street, Leicester.

ANASTIGMATS AND OTHER LENSES.

To the Editors.

Gentlemen,—I am glad to see the article by Mr. Graham Nicol on the covering power of lenses, although it emphasises truths that need to be brought home to a large body of amateurs rather than to professional photographers, who are not apt to swallow every claim made in a manufacturer's catalogue. While no ambitious amateur who can afford the purchase can abstain from the possession of an anastigmat, it is safe to say that for 90 per cent. of the work that the amateur will do a rapid rectilinear lens will be equally effective, while the quality of the negatives obtained with the older pattern will be better, because of the smaller amount of stray light inside the camera. When one comes to anastigmats with four and five separate glasses, the rapid rectilinear will win every time, even in the matter of rapidity at the same aperture. There I speak from bitter personal experience.

The R.R. has been brought into some disrepute from the fact that in later days it was manufactured, or rather put together, from lenses ground in numbers at the same time, and was sold at a price which did not allow for those niceties of construction which cost so much, and mean so much in ultimate performance. The performance of such lenses was inevitably inferior. To know what a rapid rectilinear lens is capable of one must possess an instrument such as was made by Dallmeyer, Ross, or Grubb—the latter a name scarcely known to the present generation of photographers, but the maker in his day of some of the finest optical instruments that ever left a workshop. Such lenses will run even good modern anastigmats hard in the matter of definition to the edges of the plates which they are calculated to cover.

Anastigmatism as a property in a lens is in danger of being exalted into a fetish. As a fact, the virtues of the modern lens only become conspicuous, as a rule, outside the limits of the plate for which they are listed. The use of an anastigmat gives, in most cases, a reserve power for which much has to be sacrificed, just as the high-speed focal-plane shutter, which may be used for one exposure out of twenty, handicaps its possessor for slow-speed work. My own battery of lenses for a hand camera includes the most perfect of the German anastigmats, a much cheaper English anastigmat, a rapid rectilinear, and an excellent single lens. I find that at *f*/8, which is ordinarily the largest aperture it is safe to use having regard to depth of focus and the uncertainty of judging distances, there is nothing to choose in definition between the first three lenses, while at *f*/11 the single lens begins to challenge all its competitors, and yields negatives unrivalled for brilliance.

When one passes to larger plates, the superiority of the anastigmat, whatever it be, diminishes rapidly, until one is inclined to say that the man who is working whole plates or beyond, and purchases the enormously costly anastigmats for such sizes, has more money than wit.—I am, etc., ALFRED H. WATSON.

26, Morpeth Mansions, Westminster.

AMERICANS AND BRITISH COPYRIGHT.

To the Editors.

Gentlemen,—In your article on copyright in this week's issue you make the statement that Americans may obtain copyright in Great Britain without the observance of any formalities. You are in error, as are also those eminent writers whom you cite as supporting your views. It is possible that these writers may have expressed their opinion before the issue of the Order in Council relating to the United States, but even then there was sufficient indication in the British Act to make them pause before expressing such a view.

Thus, the Act as passed contains a provision that Orders in Council may provide that the terms of copyright shall not exceed that conferred by the country of origin of the work. This was not contained in the original Act, but was introduced in its progress through Parliament. It embodies a principle which was hinted at in the original draft and shows that the Legislature did not contemplate placing the foreigner in any more favourable position regarding British copyright than British subjects were placed in with regard to copyright in that foreign country. This principle is also indicated in the provision, which appeared in the original Bill, that "the Order in Council may provide that the enjoyment of the rights conferred by this Act shall be subject to the accomplishment of such conditions and formalities (if any) as may be prescribed by the Order." A cautious writer would, therefore, have expressed doubt until he had seen the Order.

The *Order in Council* regulating copyright with the United States, issued *February* 3, 1915, clearly settles the point. This Order was delayed on account of the American Act of 1909 not having made provision for safeguarding "mechanical rights" created by the British Act of 1911.

This Order provides, *inter alia*, "that the enjoyment of the rights conferred by this Order shall be subject to the accomplishment of the conditions and formalities prescribed by the law of the United States of America."

It will be plain, therefore, that Americans, to obtain copyright in Great Britain, must register at Washington, by the deposit, in the case of an unpublished work, of "one copy of a positive print of the work," or, in the case of published prints with the copyright notice inscribed, by the deposit "promptly" after publication of two complete copies of the work. These formalities you describe in your article and your American readers will see from the foregoing that a thorough observance of them is necessary to obtain copyright in this country, failing which the work falls into the public domain.

Although I am not particularly interested in photographic copyright, my business demands a fairly close acquaintanceship with both British and international copyright, and as your article may have misled some of your readers I thought it better to pass on this correction.—I remain, yours truly, ROBERT WALLACE,

Hon. Secretary Scottish Photo-Pictorial Circle.

314, Paisley Road, Glasgow.

[We are obliged to Mr. Wallace for his letter. In order that the matter may receive the same degree of prominence in our pages as did the leading article of last week, we refer to it in a paragraph under Ex Cathedra.—EDS. "B.J."]

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

A. C. FAIR—In order to get, by easy reading, a wide general acquaintance with all photographic processes, those of the present and the chief ones of the past and of the principles of lenses, there is no book to equal Mr. Chapman Jones's "Photography of To-day," which our publishers supply for 6s. 5d. post free. Yes, it deals also with colour photography and photo-engraving.

RITA.—Potassium permanganate is very scarce now and correspondingly dear, but we should certainly think you could buy a small quantity from large dealers in chemicals such as Messrs. Johnson and Sons, 23, Cross Street, Finsbury, E.C.

A. H.—Quite true that it is no use running half-watts on a lower voltage, but we should say that a 230 v. current for 200 v. lamps is too much electric pressure. You would get a fine light, but you would cut down the life of the lamps to a good deal short of their scheduled thousand hours. We do not think for a minute that it would pay you to use these same lamps at the higher voltage.

H. E. A.—There is not, to our knowledge, any tank on the market for developing a small number of film spools. Usually dealers and photographers who go in for this branch of work get made for them a wooden tank of depth to take the lengths of spool with which they are dealing, and of breadth and width to accommodate the quantity they want. We should say that your only alternative to the Kodak outfit is to get a tank made for you.

R. E.—We think that you will find four 1,000 c.p. lamps sufficient. If you place one 8 ft. from the ground, 8 ft. from the background opposite the centre, and the other three in a curve coming round to within 5 ft. of background, you will be able to get all ordinary lightings. It is a good plan to have one lamp on a standard, say, the one nearest the background, so that it can be shifted for groups of fancy lighting. Cheap white calico is the best diffuser.

P. T.—Over-developed prints are best treated in a weak iodine-cyanide reducer made from (a) 10 per cent. solution of iodine in potass. iodide, and (b) 10 per cent. potass. cyanide solution. Take:—

(a) 30 minims	2 c.c.s.
(b) 10 minims	0.6 c.c.
Water, 2 oz.	60 c.c.s.

Adding more of (a) and (b) if necessary.

P. G. L.—The gold-toned sepia prints ought not to develop blue patches. These certainly point to carelessness in manipulation. On the other hand, our experience is that the warm red chalk tones are not exceedingly permanent. Tests which have been made by exposing such prints with one-half covered by black paper have shown that the exposed part gradually underwent slight change of colour in the light. We should say that the tone is not nearly so permanent as the ordinary sepia tone, and, in fact, is probably a little less permanent than that of an ordinary black-and-white print.

T. R. W. A.—1. The ordinary upright mantle is not the most suitable. A good inverted pattern is better, and none better than the "Howellite" burner, which you can buy for a shilling or two from Messrs. Griffins, Kingsway, and which is very much superior to the ordinary burners of this type sold by gasfitters. 2. Usually ground glass of ordinary thickness, such as is used for focussing screens, is quite sufficient. It should be as near to the mantle as it can be without risk of breaking. 3. The only suitable type of metallic-filament lamp for enlarging is the focus pattern—i.e., with the filaments brought together in a small bunch, but these are for the time being not obtainable.

S. Bros.—As regards the bluish stains, it is pretty certain that they arise through insufficient fixation. Prints now require more thorough fixation than when made on pre-war paper. We have advised many people who have been troubled with these bluish stains, and they found when they made it a practice to pass prints through two fixing baths in succession that they ceased to get the stains. We know one firm who now makes it a rule to pass all prints through three fixing baths, although we do not think the third is necessary. As regards the yellowish spots, it is more difficult to say, but we think a cause may be overcrowding of prints in the fixing bath, whereby minute air-bells stick to them, with the result that fixing is not complete.

J. W. H.—About the best little book you can get on the principles of colour photography is No. 128 of the "Photo-Miniature" series, "All about Colour Photography." No. 147 of the "Photo-Miniature" is a practical handbook on the Autochrome process. Neither of these is obtainable from the publishers in New York nor from English agents here, but we should say you could most likely get them from photographic dealers in Manchester or Liverpool such as Chapman (Albert Square), or F. V. A. Lloyd (15, Lord Street, Liverpool), who usually order each number of the "P.M.," and very likely have one of these issues still in stock. The only two other books are "Colour Photography," by Dr. Lindsay Johnson, which our publishers can supply, price 4s. 11d., post free, and "Photography in Natural Colours," by Dr. E. König, translated by E. J. Wall, obtainable price 2s. 9d.

J. E. Port.—The best book on making of half-tone blocks is "The Half-Tone Process," by J. Verfasser (Iliffe and Co.), price 7s. 6d. It is utterly useless for you to think of buying the apparatus and materials which are necessary for half-tone block-making unless you can see a sufficient demand for it, which will keep the whole equipment in constant working, and which will employ two or more people regularly on the work. We should say, at a moderate figure, the equipment would cost something like a hundred pounds. Unless your customers want blocks in a tremendous hurry we should have thought that you could have satisfied your requirements by passing on the work to some photo-engraver. Even in these times it is, we find, not by any means difficult to get half-tone blocks delivered within twenty-four or forty-eight hours of delivering the original to the engraver.

C. H. C.—Evidently there is some iron somewhere in the solution you applied to the prints before you treated them with the ferricyanide and hypo reducer. The most probable source is the alum which frequently contains iron and would have the effect which the print shows, although we cannot remember having ever seen such a strong blue stain produced in this way. We should say the best remedy you can now apply to the enlargements is to soak them in a solution of oxalate of potash of strength 75 grains in 1 oz. of water. Try this on some cotton wool on a spare print to see whether it will work. The best way to reduce a sulphide-toned print is to immerse for a time in a solution of bichromate of potash about 100 grains, water 10 ozs., with addition of about 1 oz. of strong hydrochloric or strong sulphuric acid, but these processes are not by any means certain.

E. K.—You can make up the developer for the Ilford plates from dry chemicals by dissolving in 5 ozs. of water 10 to 20 grains of pyro, 110 grains of sulphite, 110 grains of carbonate, and 2½ grains of bromide. These are the cryst. form of sulphite and carbonate. If you want to make up the solution quickly it will be better to use the dry, or anhydrous, forms, taking in this case 55 grains of sulphite and 45 grains of carbonate. As regards the bromide, the best plan is to keep it in a 10 per cent. solution, adding 25 minims for the 2½ grains. Making the developer up in this way will be a long job if you need to weigh the chemicals. Your best plan would be to get a few narrow glass tubes, such as the "tabloid" chemicals are sold in, and mark them, so as to represent the bulk of the quantity of sulphite or carbonate you require. For the pyro, if of the light sublimed form, you had better find some kind of spoon which will just hold the weight required.

W. A.—1. We are sorry we do not know any other stuff here or likely to be obtainable in Paris as a substitute for Ruberoid. There is what is called asbestos board, but it is rather tender and brittle, and while it might do for the bottoms of dishes or sinks (the sides being made of stout wood), we are quite sure it cannot be handled in the way that Ruberoid can. You could get material of this kind from dealers in builders' requisites. Failing that, we should say the only thing is to have dishes made with hard wood provided with a groove, in which you can fit glass for the bottom. 2. Hardly practicable to use gutta percha by itself; it is too slow and time-wasting a job. The usual plan is to mix the gutta percha to a solution or a paste by digesting it in the heat by turpentine, or, if you cannot get that, in the cold by carbon bisulphide. You can add some asphaltum, which will improve the waterproof quality of the coating and at the same time make it harder. A mixture of this kind is largely used for waterproofing wooden surfaces. We do not recall the suggestion to coat with tar. Presumably it would only be possible on the outside of wooden washers. 3. Without knowing exactly how the carbons of the arc stand in relation to the screen, we should say that angling the screen more under the lamp would make very little difference to the illumination of the sitter. It amounts to this—that the surface of the screen is your source of light for the sitter, and the chief part of the source is that immediately facing the lamp. You do not alter this very much by angling the screen. It seems to us the only effect would be to reduce somewhat the strength of the light thrown off by the lower part of the screen.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as "returns" are no longer accepted by the publishers. This step has become necessary owing to the further restrictions imposed by the Government on the importation of paper and paper-making materials and of the consequent shortage of supplies. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

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The Summary of contents which usually occupies the lower half of this column will be found at the foot of the page overleaf and will continue to be placed there whilst its regular position is required for notices relating to the forthcoming "B.J. Almanac."

The Day Before Yesterday.

Wednesday—"the last as ever was"—February 6—the day before yesterday—was, as it finally turned out, the day on which the 1918 Almanac was placed on sale throughout the United Kingdom. By the exigencies of newspaper production we are writing *on* this day. We are happy to know that the distribution of the Almanac is an accomplished fact.

We congratulate ourselves that despite the difficulties of the times, the 1918 Almanac makes its appearance almost at the time announced last autumn, and scarcely later than the first Almanac of the war, that of 1915, which was also the first to mark the transference of publication from before Christmas to early in the New Year. This New Year time of publication was decided in 1914, very soon after the outbreak of war. We are not at all satisfied that it can be continued in normal times, but that and many other things must await the new and happier days to come.

At any rate, we need not now inflict upon the good reader any discussion of the pros and cons of publishing before or after Christmas. Let it be now our object to proclaim the fact that throughout the length and breadth of these islands, that is to say wherever ordinary photographic requisites are purchasable, the Almanac can now be bought. No doubt, during the two days on which it has been on sale the stocks of dealers have already been drawn upon. As we have intimated in previous instalments of these notes, the 1918 Almanac, more than any other of its fifty odd predecessors, has been ordered by distributors strictly on the basis of individual requisitions placed with them. The proportion of copies ordered with a view to chance sales has probably never been lower. On which account it is necessary that those requiring the new volume should lose no time in buying it.

EX-CATHEDRA.

Lens Lore for Professionals. In spite of the efforts of the photographic Press and sundry lecturers, the knowledge of lenses in general is a sealed book to the majority of professional photographers. Many have no idea of any system of diaphragm numbering, and in one case within our knowledge one of our leading portraitists did not know the meaning of achromatism, that is to say, that an image could be sharply focussed and the exposure yield a fuzzy negative. In practice the want of this elementary knowledge often means serious pecuniary loss, as unsuitable lenses may be purchased at high prices, and lenses already on hand may not be utilised to their full capacity. The principal points on which the unscientific lens user should seek information are briefly as follow: a thorough knowledge of the values of his lenses, giving a clear idea of their relative rapidities at full aperture, with the ratio of exposures when using the single components; what "distortion" really means, the "depth of field" obtainable at a given aperture with various focal lengths; the means of controlling sharpness of definition; the meaning of spherical aberration as contrasted with curvature of field, achromatism, and the properties of non-achromatic lenses, and particularly the care of lenses. This latter is an important item, as many good lenses are put out of order, and sometimes permanently ruined, by careless handling; thus, dropping a lens may not break the glasses, but it may disturb the centering and impair the definition; careless cleaning may partially depolish the surfaces, causing dull and foggy images, while damp will corrode the surfaces, causing what opticians call rust. On the other hand, such defects as bubbles in the glass, slight scratches, and even small chips, which alarm the uninitiated, should be estimated at their true value, as these cause little harm in working. All this information is to be found in any good elementary work on photography, and bears the same relation to scientific optics that a cookery book does to a treatise on dietetics.

* * *

Plate Sizes. We note that the Kodak Company have introduced a new plate size to the American public in place of the 10 x 8 which is so popular there. Most people have regarded this as too square, as, indeed, are most of our plate sizes. The new size is 11 x 7, giving the same proportions as a postcard, which is exactly half these measurements. As far as cost is concerned, a 10 x 8 plate has an area of 80 square inches, while 11 x 7 only 77, so that the price need not be different, while a much more acceptable picture should be obtained. For a long time many photographers have used 12 x 8 plates for panel portraits, groups, and sometimes for landscapes, thus effecting a saving of 20 per cent. as compared with a 12 x 10. Of course, a 12 x 10 camera would have to be used until our makers see their way to make 11 x 7 cameras. Our American brethren seem to have a penchant for narrow pictures. Here it is rather remarkable that so pleasing a size as 7½ x 5 should have been allowed to fall into desuetude, but probably it is due to the difficulty of obtaining fresh plates of these dimensions, except by specially ordering them. It is an excellent portrait shape and is equally pleasing for landscapes. The two sizes, 11 x 7 and 7½ x 5 might well replace the 10 x 8 and 6½ x 4¾ for much professional work, and a better price could be obtained with little additional expense to the photographer.

* * *

Prints without Hypo. While there is no likelihood of such an absolute shortage of hyposulphite as would compel alternative methods of printing to be adopted, perhaps those of an experimental turn of mind may like to exercise their ingenuity in devising means by which the prints on bromide or gaslight papers could be produced in permanent form without the use of hypo. At present there is no method of this kind which would satisfy the present commercial conditions. But if conditions were altogether upset by a phenomenal scarcity of hypo it would probably not be beyond the capacity of our photographic experimenters to devise a method by which the residual unaffected silver bromide could be removed by means other than solution in hypo. One hint of such a process is contained in the reversing procedure which is employed with the Autochrome plate. In its application to prints it would, of course, be necessary to print from a positive instead of a negative, then dissolving out the developed negative image with a solvent of metallic silver, and obtaining the positive by re-development of the residual silver bromide.

* * *

Hypo Recovery. No doubt the cheapness of hypo in the past has been the cause of the absence of any investigation of its regeneration from fixing-baths at the same time that the dissolved silver is recovered. A violent disturbance of prices might lead to some consideration of the practicability of carrying out the two processes simultaneously. Plainly, the problem is that in a spent fixing-bath we have much silver hyposulphite (or double hyposulphite of silver and sodium) together with a fair excess of hypo and with other substances which have found their way into the fixing-bath from the developer. We take it that when the silver is thrown down from such a bath by means of sulphide of potash, hyposulphite of potash is thereupon formed in the liquid. Unfortunately a liquor, however rich in hyposulphite, which contains even minute quantities of sulphide is useless as a fixing-bath for gelatino-bromide emulsion on glass or paper, and it is very doubtful if means could be found for getting rid of the sulphide without affecting the hyposulphite, and without introducing substances or changes into the liquor which would unfit it for use as a fixing-bath.

* * *

Specimen Displays. Some of our readers who overload their windows, showcases, and walls with prints, all excellent in their way, might take a hint from the expert window-dressers of some of our more up-to-date shops, who reduce the number of articles shown at one time to a minimum. When the ordinary passer-by sees a window crowded with pictures, all at a glance more or less alike, it makes no appeal to him, and he goes away with no definite impression as to the character of the work, but if only three or four distinctive specimens were shown, they would command attention and remain in the mind of the observer. This fact has been appreciated by most picture dealers. The old style was to put as much of the stock as possible in the window and to leave it there, often for months without a change. The modern dealer knows better than this and shows only two or three pictures at a time, with frequent changes. This attracts attention—a picture which might pass unnoticed in a crowd of others, frequently finds a purchaser. If one compares the display in the art shops of the West End with those of less select character the difference will be clearly seen. It is that between the heterogeneous jumble of an English drawing-room and that of the Japanese, who only display one or two choice vases, bronzes or specimens of lacquer work at a time, the rest being carefully stowed away. Such a procedure not only minimises risk of injury, but it reduces the labour involved in keeping the articles in good condition. If care be taken to strike some distinctive note every time the window is dressed, people will make a point of looking out for a change, while it makes it easier for the photographer who does not have to prepare a large number of fresh specimens for each fresh display.

* * *

Magnesium Ribbon. An advertisement of flash powder is headed: "Carry your light where you carry your camera." This is good advice, and can be carried out very effectively by learning to make the best use of magnesium ribbon. Every commercial photographer occasionally finds himself in a position where artificial light is essential to the attainment of good results, but does not feel justified in carrying round a

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SUMMARY.

The 1918 Almanac is now on sale, and the whole edition has been disposed of to dealers. Intending purchasers should lose no time in obtaining copies from their dealer or bookseller.

In a leading article the question of hypo shortage is dealt with not only as a concern of the moment, but with a view to the future. The one thing to avoid in economising is stinting the use of hypo whereby the permanency of the print is affected. We point out four ways in which to make the most of the fixing bath for negatives and prints, and give an easily applicable test for exhaustion of the fixer. (P. 63.)

Reclaiming hypo from the fixing bath up to the present has not received any attention, but a much greater increase in price may lead to its practical consideration. (P. 62.)

The second portion of the paper by Mr. J. A. Orange on scientific design in optical projection deals with the necessary conditions as regards diameter and position of the condenser in relation to the film and the light, and discusses the effect of varying both. (P. 65.)

Organisation of one's business and a careful check on the cost of production are the essential foundations upon which to build up a successful concern. The photographer needs to acquire the business sense to enable him to judge between effective and ineffective economy in labour and materials. (P. 64.)

Some of the principal features of the recently introduced Patents and Designs Bill are briefly referred to by a correspondent on page 71.

Mr. A. Lockett has made some experiments in reference to the "Mackie" line phenomenon, and finds that a large proportion of what are thought to be white-line effects have no real existence, but are an optical illusion. (P. 67.)

A recent patent specification describes a method of producing cinematograph advertising cartoons, in which different sets of wording may be incorporated with the same moving figures. The process consists in simultaneously photographing text and printing of the negative, on positive film, without the use of shields. No special cinematograph camera is required, provided there is accommodation for a double set of films and for four reels instead of the usual two. (P. 68.)

A field of experiment is open to photographers for the discovery of a possible substitute for hypo in the event of a serious shortage of this chemical. (P. 62.)

We emphasise the importance to professionals of a slight knowledge of elementary optics. (P. 61.)

The breaking of a carboy of nitric acid in a process engraving works was the cause of two deaths last week. (P. 70.)

flashlight outfit, even were he permitted to use it. But with half an ounce of magnesium ribbon, a wooden clip with which to hold it, and a box of matches, he is always ready for the unexpected. A few hints on the subject may not come amiss; to begin with, the ribbon must be perfectly bright or it will not burn well, and as the surface rapidly oxidises it is advisable to brighten it just before it is required by drawing two or three times through a folded piece of fine sandpaper: one the size of two postage stamps is sufficient. Bearing in mind that a given weight of magnesium yields, when burnt, a certain amount of light, it is desirable to twist several short strands together to form a torch, rather than to attempt to burn the same quantity in one length. Moreover, it is a safeguard against extinction, as if one strand goes out the others will relight it, so that the exposure is not interrupted. As flaming particles sometimes fall off, an old rug, tea-tray, or the like should be placed so as to prevent burning the floor or carpet. For single objects or portraits the ribbon should be burned behind a tissue-paper diffuser. With large groups or interiors sufficient diffusion may be obtained by waving the light about during the exposure. Magnesium ribbon affords a handy means of printing very slow developing papers. If a number of printing-frames be placed in a circle and an inch or two of ribbon burned in the centre the very long exposures necessary when gaslight is used are avoided, and by burning the same quantity of ribbon each time uniformity of exposure is obtained.

THE HYPO SCARCITY—WHAT TO DO ABOUT IT

According to our information the present scarcity of hypo is not so serious as to amount to a famine. Floating supplies are undoubtedly small, but no doubt photographers generally warned by previous shortages have taken the precaution to provide themselves with stocks sufficient to tide them over such periods as the present. At the same time there is the shortage and the question requires to be answered how it shall be best dealt with with a view not merely to the present juncture but also to that of similar happenings in the future. Before dealing in turn with several points we would be allowed to say that one thing which most certainly should not be done is to skimp the use of hypo and thereby to issue prints the permanency of which is a question of weeks or months. It would be a thousand pities that the shortage of an essential material should prompt such a course as this. Photographs at the present day enjoy a deserved reputation for a very fair degree of permanence. It would be far better to make them very much more costly things than to endeavour to make an insufficient supply of hypo go round by stinting its use.

It must be remembered that there is no workable substitute for hypo in the fixation of plates or prints; and there is no substance which can be added to hypo in order to make it "go further." Additions such as ammonium chloride (sal ammoniac) have the effect of making a fixing bath quicker in action, but they do not allow of a larger number of plates or prints being fixed with a given weight of hypo. Therefore a photographer's consideration at the present juncture requires to be of the practical ways and means which can be adopted for reducing wastage of hypo. Apart from such sheer waste as occurs in handling the solid chemical—which we think is negligible and may be at once put on one side—wastage of hypo consists in discarding fixing baths before they have done as much work as they are capable of. How then are baths to do more fixing work without prejudice to the quality and permanence of the results? Broadly, there are four ways in which a fixing bath, as it is commonly used, could be better employed. These are:—

(1) Rinsing between development and fixing.
(2) Testing for degree of exhaustion.
(3) Passing on print fixers for use with plates.
(4) Keeping at suitable temperature.

These provisions apply broadly both to negatives and prints, but their application is naturally more in respect to prints, for the reason that prints occupy a much larger proportion of a photographer's output and call for more careful supervision as regards fixing. We will now take these four points in succession and endeavour to indicate simple procedures which photographers and their assistants can and should adopt as a means of economy in the essential hyposulphite.

(1) *Rinsing after development.*—This applies particularly to prints, since rinsing the developer from the surface of a print very greatly reduces contamination of the hypo bath by developer, with its effects of stain and, in aggravated cases, of muddiness in prints. In the case of papers such as bromide, which are fixed in a plain, as distinguished from an acid, bath, the omission to rinse prints before placing in the fixer will often cause the hypo bath to develop a strong colour long before its fixing powers are approaching exhaustion. Plainly, economy in hypo will result, under these conditions, from cleansing the prints from developer before they go into the fixer. In the case of prints of the gaslight type, which usually are treated in an acid fixing bath, a brief wash-off of developer is in a somewhat different category. With some gaslight papers it is essential to use an acid fixing bath, and when that is the case there is not much advantage in rinsing after development. In fact some papers will not stand such rinsing but yield yellow stains unless plunged immediately into the fixer. On the other hand, some gaslight prints will bear fixing even in a plain hypo bath, and at the same time will not suffer by receiving a brief rinse between development and fixing. We advise photographers to discover for themselves just what the brand of paper which they are using will allow, and then, if practicable, rinse between development and fixing; also, again if practicable, fix in a plain instead of an acid bath. Hypo in plain solution goes further than in any other form.

(2) *Testing Exhaustion.*—In the case of plates, we can see for ourselves by the slowness with which they clear that the fixing bath is nearing the end of its tether; in the case of prints no such evidence is afforded, and it is here that some working test is necessary to show how the fixing bath is getting on and to avoid discarding it whilst it still retains ample fixing powers. A test of this kind which anyone can apply for himself is as follows:—

A few ordinary dry-plates—any make, any grade—are cut up into slips of, say, one inch width and three or four inches length. It doesn't matter whether the plates are fresh or stale, nor is it a question of any great importance whether they have been exposed to daylight before being used for the test. Preferably they should not be exposed more than necessary. Our own practice is to cut up the plates by a bright yellow light in the dark-room and then to keep the slips (without any wrappings) in a plate box. The exposure to light which they get in the print-fixing room, when taking out a single slip, will not do any harm. One of these slips is then put into the fixing bath, which has been in use for a larger or smaller number of prints, and a note taken of the time required for the white emulsion to dissolve out. If this time requires to be longer than ten minutes the bath may be discarded, at any rate for fixing further prints, and it may be said that the test, rough as it is, is a pretty fair indication that hypo in the bath has been used up as far as is advisable without risking the permanence of prints. Our opinion is that a method of testing, such as just described, is a better system than allotting so much hypo to fix such-and-such a number of prints or postcards. We think that a system of allowing, say, one pound of hypo for 150 postcards (to quote figures which were recommended a year or two ago by one maker of postcards) is more likely to lead to wastage of hypo than the use of an actual test. Moreover, where large quantities of prints are being put through it is not so readily applied.

(3) *Print Fixer for Plates.*—Inasmuch as almost all development papers can now be fixed in a bath containing four or five ounces of hypo per twenty ounces of water without ill-effect in the way of blisters, it is often possible to pass on the fixing baths (which have done duty for prints) for subsequent use in fixing negatives. But discretion requires to be used. Plainly, it will not do to risk impermanence of negatives for a few ounces of hypo. Plates differ in quite a marked manner as regards the "cleanness" with which they fix out in a bath which is getting near to the "off-strength" point; and it is open to serious doubt whether some plates will fix completely at all if they require to be longer in the fixing bath than, say, fifteen or twenty minutes before the white emulsion disappears. Therefore, in using baths which have been employed for prints an eye should be kept on this point. In any case such baths should be used in tanks, not dishes, in order that a large number of negatives may be fixed together and time thus economised; and further, the fixing bath requires to be kept up to a reasonable working temperature.

(4) *Temperature.*—This brings us to our last point, which is that the fixing-bath, whether for plates or prints, should not be below 60 or 65 degs. in temperature. The temperature should be tested with a thermometer, not guessed, and the bath requires to be kept at this temperature. In the cold dark-rooms which, we fear, in many establishments are the rule, artificial heat is necessary for this purpose. In the case of dishes it is unsafe to warm by placing the dish directly over (even if some distance above) a moderate source of heat, such as a small ring gas-burner turned down to the blue. In such circumstances it is almost inevitable that the fixing solution will not be uniformly heated. If it is left to itself for a while it can easily happen that it will get too warm in places, and may lead to softening or melting of the emulsion coating on prints sufficient to spoil the prints at this stage or to give rise to blistering in the after-process of sulphide toning. Some means should be taken to distribute and equalise the heat. This may be done by standing the fixing-dish in a large baking-tin containing clean sand or fine shot to the depth of about a quarter of an inch, or by placing the fixing-dish in a larger dish containing water. Still more necessary is it to ensure uniform distribution of heat, as far as possible, in the case of fixing tanks, which require to be stood in a larger metal tank—an old washer can often be requisitioned for the purpose—filled with water above the level of the hypo solution in the fixing tank. By taking means such as these, in the case of either dishes or tanks, it requires little ingenuity to adapt any convenient source of heat, such as a ring gas-burner, a small oil stove, or a single paraffin lamp, to keep the fixing solution at a temperature which will make the best of its fixing powers.

There are several other minor measures which should be observed in the economical use of hypo. In making up fixing baths the hypo crystals should be weighed, or measured by bulk. In the days when hypo was the cheapest of commodities it was too commonly the practice to make up baths simply by shovelling the crystals by the handful into the water for their solution.

Another point is that, in transferring prints from the fixing bath to the first wash water a great deal of hypo solution can be carried away and lost. It would probably surprise anyone who cares to make the experiment to find how much fixing bath can be collected from a batch of prints simply by allowing the drippings, which usually find their way to the wash water, to accumulate. If prints are drawn slowly from the fixing bath the greater proportion of the solution will be drawn away from the surface and will be kept in the bath.

But perhaps more important than any of these minor measures is the practice of keeping prints constantly on the move whilst in the fixing bath. Hypo does its work quickly and surely and without waste, but not unless the hypo solution is brought freely into contact with the surfaces of prints and is given the opportunity of penetrating into the pores of the emulsion, whilst at the same time the solution charged with the silver salts from the emulsion can pass out into the surrounding bath. If this essential feature of the fixing process were kept regularly in mind we should hear less of complaints of stains and the like from incomplete fixing.

◆

COST AND PRODUCT.

We are living and carrying on business under conditions which four years ago would have been considered impossible, yet on the whole photographers have not done badly, in spite of the enormous increase in the cost of all materials and the much higher rate of wages which has prevailed in consequence of the scarcity of skilled labour. To attempt to prophesy when the present state of things will end and what conditions will prevail after the war would be a fruitless task, but one thing is certain—that money will not be so plentiful and that prices will not in our time sink to the pre-war level, especially in the case of wages, which are, outside "one-man" businesses, one of the greatest outgoings in most concerns. It is, therefore, necessary for every producer so to organise his establishment that he is assured that he is receiving full value for every penny of his expenditure, and this applies to the smallest as well as the largest businesses.

Photographers as a class are not good men of business, not because of any lack of mental capacity, but simply from lack of training. In only a few instances can we recall the names of those who have made large fortunes, and they were business men who never did any practical work themselves, devoting their energies to directing and exploiting the labour of others. This is no reason why the photographer should not endeavour to acquire the special knowledge and habits which make the difference between struggling for a bare existence and piling up a comfortable surplus.

In every successful manufacturing concern the manager has the words "cost of production" burnt into his brain, and next to maintenance, or, better still, improvement of quality, they are his chiefest care. Hard work does not always tend to economy. Some men are so busy that they cannot stop to look and find the openings through which the results of their industry are leaking away, while others, with more business acumen, always seem to have time for any necessary purpose without neglecting the ordinary run of work. How can we apply this to the photographer? The first point to be considered is that of labour, and unfortunately the great body of photographers have not yet realised that in buying this, as is the case with most commodities, the best is the cheapest in the long run. A skilful, well-trained assistant, who can be relied upon to develop batches of plates uniformly and well and turn out his tale of perfect prints without constant watching, may command ten or even twenty shillings a week more than a duffer; but the saving of material, not to speak of the release of the principal for more important work, will soon show a balance on the right side. It may be urged that such assistants are difficult to find, but if they cannot be found they must be made. The general entry of women into all branches of the profession has made a great difference in this respect. Leaving out operating, a field in which women certainly have made good, we have dark room hands, platinum and bromide printers who were formerly spotters, who have taken up the new work with enthusiasm since 1914, and can now give points to their male predecessors both as regards quality and quantity. One error must be avoided, and that is of endeavouring to get efficient female labour at a lower rate than should be paid to men. We are convinced that such a policy is a mistaken one. In many studios, even now, girls are employed at wages on which they could not exist if they were not living with their friends, who are thus indirectly subsidising their employer's business. How can it be expected permanently to attach their interest to the business?

Closely connected with the efficient and well-paid assistant is the question of economy of plates and other materials. The worker who realises that his future prospects and general well-being are bound up with those of his employer is not likely to waste material himself or to allow others to do so. By careful attention to storage and wrapping alone, several pounds a year could be saved in the matter of mounts, plates and paper in studios of even moderate size, and this could be added to by equal care in the mixing and use of chemicals. Where bromide paper is used from the roll it is often cut to waste, and very often there is much paper wasted upon trial prints for which a fragment would have sufficed. All these economies may seem trifling and almost unworthy of notice, but in a case recently under notice they resulted in a saving of £50 in the year, and there are few photographers who would refuse that sum even at the cost of a little vigilance.

Cash discounts afford one of the easiest ways of making or losing money, whichever way one likes to put it. If 5 per cent. is lost by not paying promptly each month, it comes to 60 per cent. per annum on the amount of one month's purchases. Surely it is worth while to save this by dispensing with all unnecessary expenditure until everything is paid up to date and full discounts taken. Slackness in bookkeeping is another way of dissipating profits. If statements are not regularly and promptly rendered, removals, deaths and other happenings may render recovery of debts difficult if not impossible. Steady, polite dunning will be found the best policy. More than one business has learned to its cost that a long period of slackness followed by drastic measures in the County Court is not the way to retain popularity either with bad payers or their friends, who might be desirable customers in the future.

SCIENTIFIC DESIGN IN OPTICAL PROJECTION.

II

The projection of motion pictures, while optically but an outgrowth of magic-lantern work, is relatively complicated by the presence of peculiar features. The simplest mode of consideration is to omit all reference to the film movement and shutter action in the first instance, the problem being thus reduced to the projection of lantern slides 2.5 cm. in diameter as against 10 cm. One has, as before, an objective for the actual projection of the picture, and just as in the case of the magic-lantern previously discussed the limiting illumination at the screen is $\frac{AB}{r^2}k$, and the ideal means of attaining it would be an extended background of source surface behind the slide (Fig. 3a). This is as impracticable as in the case of the magic-lantern proper, and the logical thing to do is to provide a condenser immediately behind the slide, followed in turn by a light-source surface. Even this miniature edition of the complete magic-lantern is difficult to use except in amateur work. The reason is best seen from a numerical example.

A regular magic-lantern might disclose the following particulars:—

Slide diameter	10 cm.	4 ins.
Objective focal length	36 cm.	14 ins.
Effective objective aperture	4 cm.	1½ ins.
Light-source size	1 cm.	⅜ in.
Clearance, source to condenser	10 cm.	4 ins.

Now, if one wished to make a change from slide to film (i.e., 10 cm. to 2.5) keeping throw, picture size and illumination the same, then the following would be about the scheme:—

Slide diameter	2.5 cm.	1 in.
Objective focal length	9 cm.	3½ ins.
Effective objective aperture	4 cm.	1½ ins.
Light-source size	1 cm.	⅜ in.
Clearance, source to condenser	2.5 cm.	1 in.

What one may term the factor of clearance, *i.e.*, the ratio of the last two terms, constitutes a serious difficulty because of the marked heating effect on the condenser and on the lamp bulb, if there is one. This difficulty becomes less marked in the cases where a smaller screen picture will suffice, and, in fact, there are successful amateur outfits designed along these lines (Figs. 3b and 3c).

To avoid this trouble it is well to arrange theatre outfits so that instead of having a small condenser immediately behind the film one has a larger condenser further away. So long as the outlook through the film from all parts of the objective opening is faced by condenser surface, limiting illumination at the screen is possible, subject to the inevitable condenser losses (reflection, absorption, and, in the case of Fresnel lenses, interruption between rings). (Fig. 4a.)

There are an indefinite number of possible condenser positions, the greater the distance from the film the greater being the diameter of condenser required to give limiting illumination over the screen. The single advantage of increased light-source clearance has to be set off against increased absorption and increased cost as well as a slightly decreasing economy, *i.e.*, the more remote condenser positions require a slightly larger extent of source if the size of the condenser, but not its form, be varied). For these reasons it is well to adopt a condenser position which is as near the film as is consistent with a satisfactory light-source clearance. The maximum useful extent of condenser opening in any plane is defined by the locus of points from which it is possible to see through both aperture plate (the frame of the film) and objective simultaneously. The best position for the light-source and the maximum useful extent in that position are most easily determined by back-testing as described in the magic-lantern section. This point should be noticed, however; for some condenser arrangements back-testing will reveal two well defined spots in different planes, one being rectangular and the other circular. Naturally the smaller spot is the more economical source-position, and either spot may be the smaller according to circumstances. *The only kind of source which may be placed in correspondence with the rectangular spot, however, is one devoid of structure, such as a flame, because any light-source structure will be more or less clearly imaged in the film position and in turn on the screen.* With a rough light-source it is essential to place it nearer to the condenser; how much nearer is a question which depends on the degree of roughness of the light-source (*coarseness and contrastiness of structure*), the relative aperture of the objective and the degree of evenness desired in the screen illumination. In the case of a suitable tungsten-filament and customary objective aperture, it is sufficient in practice to adopt the sharpest circular spot as light-source position. (*In short, while a perfectly smooth source may sometimes advantageously be placed conjugate with the film, a rough light-source must be placed more nearly conjugate with the objective opening.*)

It is advisable to consider at this stage what effect is produced in the general case, if one "stops down" or reduces the opening of a condenser so that it no longer satisfies the primary condition for limiting illumination over the screen.

In general the condenser opening is imaged some little distance ahead of the objective. (*It may be readily found by using a slip of paper.*)

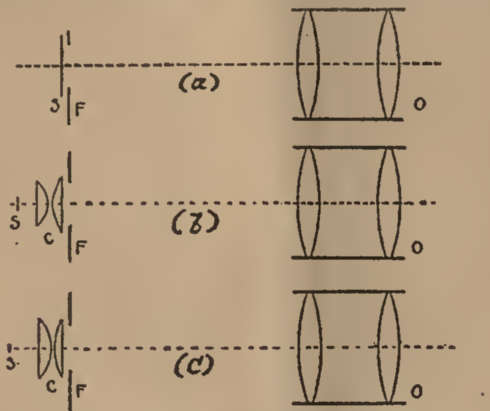


Fig. 3.—Motion Picture Systems. (*a*) Ideal. (*b*) Magic Lantern Type; adapted for theatre use. (*c*) The same adapted for amateur use.

The effect is this: *From any viewpoint on the screen one sees as much of the objective opening at standard brightness as may be seen through the imaged condenser opening.* Thus with some particular example of condenser opening it may happen that central points on the screen have a view of the objective opening quite unrestricted by this imaged opening, while peripheral points are not so fortunate. The result is a waning illumination as one moves towards the edge of the screen, a so-called vignetting action.

It is important to notice the various stages in the transition arising from a gradually shrinking condenser opening in the general case where the condenser is not very close to the film. First, with the condenser opening sufficiently large, limiting illumination is possible at all screen-points. Reduction of the opening is first effective in a slight darkening of the corners of the picture. The effect becomes more marked, and eventually it is impossible to get limiting illumination even at the centre of the screen. Carrying the reduction of the condenser opening further and further, the screen illumination steadily decreases, but it becomes gradually more uniform. At a certain stage it becomes quite uniform, and although further reduction of condenser opening leads to decreased illumination, yet the distribution stays uniform. These changes are illustrated in Fig. 5, representing the distribution along the diagonal of the screen.

It may well be asked, of what interest is it to consider anything but the primary condition in which the condenser opening is large enough to secure limiting illumination all over the screen?

The extreme case of restricted condenser opening is very interesting because it is a condition advocated and practised largely in the theatres to-day (Fig. 4*b*). That is, a plano-convex condenser system of 4 in. (10 cm.) opening is often placed at 15-20 in. (35-50 cm.) from the film. The arrangement approximates to the stage *e* shown in Fig. 5, low, but uniform illumination. There are advantages unconnected with illumination associated with this arrangement; these advantages will be related later and shown to be over-estimated.

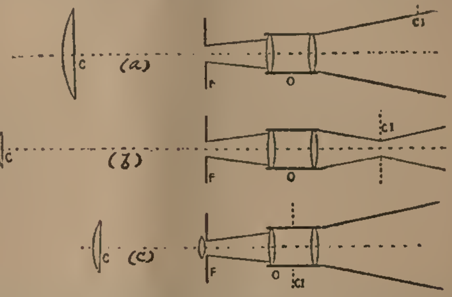


Fig. 4.—Motion Picture Systems. (*a*) Large remote condenser for limiting illumination. (*b*) Small remote condenser for low, even illumination. (*c*) Use of a field lens adjacent to the film. C=condenser, F=film, Cl=image of condenser opening. Outlines of useful beam shown in each case (for shutter design).

The case of a slight restriction of condenser opening is of practical interest for the following reasons. The slight vignetting is not a serious disadvantage at least; some even go so far as to claim it as a positive improvement of the picture. There is quite an advantage in being able to use a smaller condenser size, both on account of cost and, more important, the saving in thickness of glass which results in an improved source-clearance.

To summarise, the condenser for motion-picture projection may conform with any of three conditions:—

(1) Miniature magic-lantern arrangement; condenser a little larger than the film and placed close behind it.

(2) Condenser at a distance from the film and of such a diameter as will lead to limiting illumination over the screen, or at any rate over the greater part of the screen.

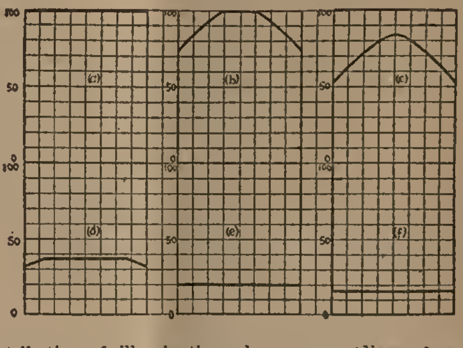


Fig. 5.—Distribution of illumination along screen diagonal as affected by relative opening of motion picture condenser; openings diminish from (*a*) to (*f*). abscissae=points along screen diagonal—ordinates=intensities.

(3) Condenser at a distance from the film and of such small diameter as will give even, or practically even, illumination.

(There is a fourth arrangement which has had various supporters; this employs, in addition to the condenser proper, a small field-lens close to the film such that the condenser opening and objective opening are respectively conjugate, or in the relation of object and image. Lack of space forbids more detailed mention. (Fig. 4*c*.)

As regards the form of condenser best suited to motion picture projectors, a few remarks may be of interest.

Amateur outfits using the magic-lantern arrangement will give satisfaction with plano-convex condensers. The mode of operation resembles that of the arc lantern; that is, the effective aperture is less than the gross opening. (Fig. 3c.)

Corrected, *i.e.*, non-spherical, condensers have greater possibilities with such outfits, but it is largely a question of cost. Such condensers would be very desirable if any attempt were made to use this arrangement in theatre work; in fact, they would almost be essential. (Fig. 3*b*.)

Of the other condenser positions, it may be said that the nonspherical construction is always an advantage in spite of the fact that spherical aberration is not always a detriment (in limited amounts). There is always a saving in lens thickness, and hence a diminished absorption and an improved source clearance when the corrected surfaces are used.

A peculiar form of condenser of the Fresnel type can be used for any position not immediately adjacent to the film. In estimating the relative utility of such a condenser it is necessary to set off the advantages of small thickness (hence low absorption and good source-clearance) and cheapness against the disadvantages of considerable "discontinuity" and surface-scattering losses.

(A Fresnel lens necessarily has interruptions of aperture between the prismatic rings; in its aperture relations it is analogous to an ordinary condenser having black paper rings pasted on it.)

There is a possibility which has not been discussed, namely, the use of an extent of source which is smaller than that really called for by the optical train. This alternative, which involves using a smaller effective aperture of objective for any particular screen-point than would otherwise be used, cannot be adequately treated here. The resulting illumination is correspondingly low and there is no apparent advantage associated with this arrangement.

J. A. Orange.

(To be continued.)

THE "MACKIE" LINE—SOME NEW FACTS AND EXPERIMENTS

The following article is not intended to traverse the accepted theory that the so-called "Mackie" line is due to unused developer in the shadow portions of the negative reinforcing the solution in the adjacent strongly lit parts, in the absence of rocking, and thus causing a narrow band of greater opacity to encroach on the lights and to print as a lighter line. Neither is it wished to deny the minority contention that similar results have been obtained from other and, at present, obscure causes. It is merely desired to point out the curious fact that a large proportion of what are thought to be white-line effects have no real existence.

The writer recently made a series of experiments in the visual examination of subjects where a white or light tone came abruptly against a dark one, selecting for convenience those in which the line was straight, and found, to his surprise, that in quite a number of cases the narrow line of greater brightness inside the edge of the lighter portion was unmistakably visible both in the subject and on the focussing screen, not only to himself but to independent observers, and was also apparently recorded in the negatives.

It was obviously necessary, before any weight could be attached to the evidence, to ascertain that the effect was not an optical illusion, for the mere fact that various people agreed in seeing it was insufficient. Several methods were adopted to check this.

Experiment 1.—Exposures were made on a few selected subjects showing the line on the focussing screen, using flat films. On development, the line of greater opacity was distinctly seen in the negative. When dry, the film was cut carefully along the boundary between the masses of light and shade. Result, the line disappeared and could not be detected, even with a good magnifying lens. It reappeared, however, on putting the halves together again.

Experiment 2.—A negative showing the white line was enlarged, the line being very clearly visible in the enlargement, though seemingly not much wider. The latter was then cut across at the shadow boundary, the line again disappearing.

Experiment 3:—Several negatives in which the line occurred were held up to the light, and the more transparent portion of the image was covered with a card up to the boundary. Result, instant vanishing of the denser line. This happened in almost every case.

As a guide to those who would like to repeat these experiments, the line may be sought for where the margin of an archway or other opening meets a brightly lit view beyond, the line, of course, being at the boundary of the view, not of the archway; at the edges of flowers and their stalks, against a darker ground; at the edges of the coats, hats, hair, or faces in portraits, when these are lighter than the background, or just external to them if the background itself is lighter; round the sails of yachts against the sky; round roofs, chimneys, spires, etc. Generally speaking, the illusion is more likely to be present when the light and shade are both of an intermediate tone, rather than a dark black or a pure white, the outline or junction being somewhat soft instead of sharply defined.

The writer next selected about a dozen photographic prints, including portrait, landscape and architectural subjects, several engravings, a number of half-tone reproductions, and one or two coloured lithographs, all showing the peculiar line, and ascertained its visibility to different observers. By similar cutting methods, however, or by covering up the darker part of the image, with a card approximately the same tone as the light ground, the line was found to take flight, except in seven instances, three being photographs, two engravings, one a half-tone, and one a lithograph. With respect to the three photographs and the half-tone there were no data available on which to base an explanation of the white line, but in the engravings and the lithograph it seemed to have been deliberately introduced by the artist—a not uncommon practice—as it sometimes gives added relief and a better impression of roundness. The line, in fact, is often a beauty instead of a defect.

Anyone may readily familiarise himself with the remarkable optical illusion that has been demonstrated by cutting a disc of black paper about ½ inch. diameter and pasting it on a white card. On looking directly at the disc a much brighter ring will be plainly seen outside the margin. If a white disc is mounted on a black card, the lighter ring will appear inside, though it is not quite so striking. It seems to grow more distinct if the eye is kept on it for a few seconds, and is possibly partly a contrast effect, partly an overlapping "after-image" due to retinal fatigue.

A. Lockett.

Dry Storage.—To many the idea may be old, as, in fact, it is; but, as a matter of experience (writes Mr. H. B. Morgan, of Rhos-on-Sea, to the "Pharmaceutical Journal"), I have found that few pharmacists realise the value of a large box with a well-fitting lid, the lower part of the box filled with lumps of quicklime, as a receptacle in which goods may be kept perfectly free from moisture. In the East, where at certain seasons the boots I took off at night would have a growth of mould by the morning, and everything was damp, warm, and sticky, such boxes were invaluable in preserving certain drugs, photographic papers, etc. In England the lime is a long time before it slakes, and the whole arrangement gives but little trouble.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

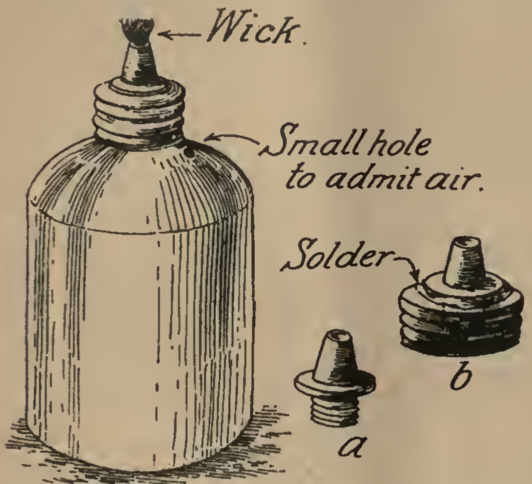
A Handy and Inexpensive Lamp.

Here is a little idea of my own which I suggest as being very useful, cheap to make, and very economical in use. All that is required is a screw-top metal-polish tin, a nipple from the gas-fitter's, with one end tapered, price one penny (*a*, fig. 1), a little solder, and some wick.

First of all, make a hole in the centre of the screw-cap sufficiently large to take the straight part of the nipple, and solder the two together, as at *b*. Providing the nipple fits tight enough in screw-cap, the solder is not necessary, although, of course, it makes a much better job.

Now thread the wick through the nipple (which is now the burner), just sufficient to give a good light without smoking. Puncture a very small hole near the screw-cap in the metal-polish tin to admit air as the paraffin is burned. Now fill the tin with paraffin, screw on the burner, and the lamp is ready for use.

If left burning overnight it helps considerably in keeping the developing solutions, etc., from getting below normal. As proof of this, I have not had any glacial acetic acid frozen since I burned one of these lamps overnight; in fact, I have several in use, some of which I have blacked, and fitted with a small holder to carry an opal shade. Although this is not necessary, it gives a smart appearance, and the lamp answers quite well for lighting up dark passages.



My lamp which I made in this way has burned over 100 hours at a cost of one penny for paraffin, and it looks as though it will burn for another fifty hours yet. In these days of scarcity of matches one or two of these lamps are a great convenience. Keep one near—but not too near—a gas stove. Use it for lighting a paper spill. —Harry Duckworth.

A Simple Retouching Desk.

A large sheet of three-ply wood, stiffened with battens, forms an ideal retouching desk by merely making one or more apertures and leaning it against a window. The top batten, with advantage, may be a little longer than the board, so as to engage on a pair of hooks or other simple supports on the window-frame. This will prevent slipping of the desk and ensure rigidity. If there is a clear light from the sky, a piece of ground-glass fixed against the window will be good to work by, otherwise a reflecting board is required, which may be just a sheet of white cardboard supported by a box, or can be a board hinged to the desk itself.

While working, the window-blind (preferably not an opaque one) is brought down just over the top edge of the desk. In this way two people can work in comfort, with plenty of room to move both arms and negatives, and without the partial suffocation and consequent drowsiness often associated with retouching desks. Another advantage is that such a desk is instantly removable, and it does not collect dust.—D. B.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications January 14 to January 26:—

Washers.—No. 1,043. Apparatus for washing photographs. P. H. Waddell.

Cinematography.—No. 1,253. Cinematographic projection apparatus. E. E. Halford.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Cartoon Cinematograph Films.—No. 112,210 (March 27, 1917). The invention relates to cartoon advertising films consisting of a series of moving figures accompanied by suitable wording. It consists in a process for taking the films such that the same series of moving figures can be incorporated with different sets of wording, and thus used for different advertisers.

In making the negative film of the action the stage or field is arranged with a black background and light or white drawings and with no shield to provide for text on the positive film. The successive action set-ups are photographed upon the negative film in any suitable moving picture camera. When this film is developed it shows a white field with black or dark surfaces or lines thereon depicting the action. A space is, of course, left on the field in which the text will appear in a completed positive, but no framing or shield is required for this space.

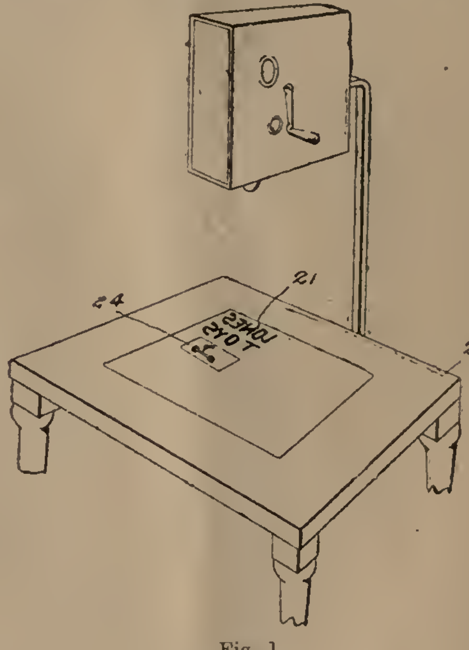


Fig. 1.

For the text the photographing field is white. The lettering is placed thereon in black in reversed position. This may be accomplished in any suitable way.

A moving picture camera is provided having any suitable intermittent mechanism, but with provision for running two films through this mechanism at the same time. This is done by providing two reels in addition to the two ordinarily used in the camera. These two additional reels are to hold and rewind, respectively, one of the two films that are to be placed in the machine. There are also suitable guides to bring the extra film into contact with the other one as it passes through the film [illegible] at the rear of the lens. A raw positive film is placed upon one of the reels and the completed negative previously described is placed upon another reel, and the two films are threaded through the machine, emulsion sides together, and with the negative film nearest to the lens. The perforations in the two films are engaged simultaneously by the teeth of the feed gears, and the films are thus positively maintained in proper relative position. It is not necessary to take any pains to register the two films, because, evidently, the positive film has not been exposed, and it is only necessary to bring the films to [illegible] position that the first negative picture that is to have a text incorporated with it on the positive, is in position behind the lens. This text being set up on the stage, the operating mechanism of the camera is actuated one or more times, and the rays of light from the field pass through the camera lens, and through the clear part of the negative film reserved for the text and photograph the white field and black lettering upon the positive film. This part when developed will, of course, show white letters upon a black background. At the same time the intense light passing through the lens from the white field penetrates all the other parts of the negative and prints the dark parts of the negative on the positive film, which, when developed, will, of course, show the lines or surfaces of the action in white or light shading upon a black ground.

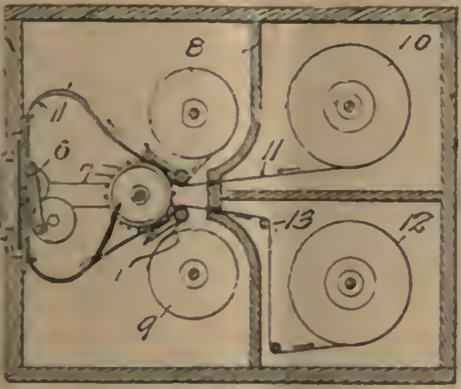


Fig. 2.

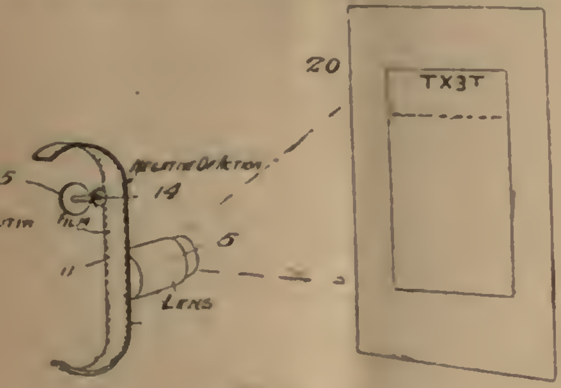


Fig 3.

There is thus produced in one operation a photographing of the text and printing of the negative upon the positive film, and this is done without particular attention to registry of films; without the use of shields; the black background produced on the positive is uniform throughout, because it is produced at a single exposure, and the light proceeds from a single and uniform reflecting surface. The completed film shows the desired light lines on the black background, while in the process one complete major operation is entirely eliminated and other tedious and expensive steps, such as the placing of shields, etc., are also eliminated.

An advantage of the process is that it permits inserts, such as [illegible] of engravings or drawings of the particular advertiser's goods, to be added to the positive film in conjunction with the text. In carrying out this part of the invention a paper negative print is made of the desired cut, drawing or typewritten matter, and this negative print placed on a suitable part of the field at the same time that text matter is being photographed. Allowance of space for this added text matter will, of course, have to be made in preparing the negative film.

In the drawings Fig. 1 is a diagrammatic view of a moving picture camera arranged over a suitable table or stage, and the stage in turn arranged for the photographing of the text; Fig. 2 is a longitudinal section of a suitable moving picture camera provided with extra spools for positive films; Fig. 3 is a diagrammatic view exemplifying the printing of the negative upon the positive film and the simultaneous photographing of the text; Fig. 4 shows a short section of a negative film; and Fig. 5 shows a short section of the completed print or positive film. Reginald Victor Stambsugh, 1,222, Ontario Street, Cleveland, Ohio, U.S.A.

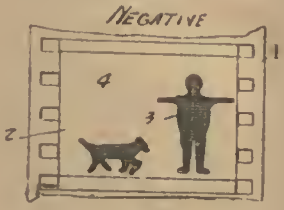


Fig. 4.

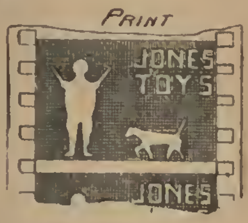


Fig. 5.

Analecta.

Extracts from our weekly and monthly contemporaries.

Passe-Partout Frames.

This is the time of year when trouble is rife with prints framed in passe-partout style (says a writer in *Photography and Focus* for February 6). Excessive damp may loosen the binding strips. If dealt with at once this may be remedied by drying the glass and pressing the damp binding again into contact with a duster. But a more serious trouble arises when the prints are hung by means of small brass rings secured by paper fasteners passed through the backing board. These rings, made of very thin brass, are exceedingly perishable. Sooner or later they give way and the frame falls. To take the whole arrangement to pieces, replace the rings, and rebind is a tiresome operation and involves a recurrence of the same trouble in the future. A better plan is to discard the rings altogether. Two strips of stout tape can be folded and stuck down on the back a convenient distance apart, leaving about an inch free at the doubled end. A patch of paper is then pasted down on the back, covering the tapes, with the exception of the free loops, through which the cord to suspend the print is then passed.

FORTHCOMING EXHIBITIONS.

February 2 to 9.—South Glasgow Camera Club. Secretary, John Baird, 164, King's Park Road, Cathcart, Glasgow.

February 9 to 16.—Glasgow and West of Scotland Amateur Photographic Association. Secretary, G. S. McVean, 125, West Regent Street, Glasgow.

February 16 to March 2.—Edinburgh Photographic Society. Sec., P. T. Mackintosh, 38, Castle Street, Edinburgh.

February 21 to 23.—Leicester and Leicestershire Photographic Society. Sec., H. C. Cross, 80, Harrow Road, Leicester.

March 12 to 15.—Hackney Photographic Society. Sec., Walter Selfe, 24, Pembury Road, Clapton, E.5.

April 18 to May.—Hampshire House, Hammersmith, Photographic Society. Entries close March 19. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, February 11.

Dewsbury Photographic Society. "Photography and Art." E. R. Blakeley.
Bradford Photographic Society. Exhibition of Pictorial Photographs by Leeds Camera Club and Leeds Photographic Society.

Tuesday, February 12.

Royal Photographic Society. Ordinary Meeting and Annual General Meeting.
Birmingham Photographic Society. "The Dolomite Country and Dalmatia." Walter Barrow.
Keighley and District Photographic Association. "Airedale." T. Mountain.
Stalybridge Photographic and Scientific Society. "Lantern Slide Making.' J. Welch.
Hackney Photographic Society. Annual Sale.
Manchester Amateur Photographic Society. Monthly Meeting. "With a Naturalist on the South Coast of Devon." A. Bradshaw.

Wednesday, February 13.

Croydon Camera Club. "How I Constructed and Fitted Up Our Dark Room.' B. J. Rose.
Photo-Micrographic Society. "Some Effects of Micro-Organisms on the Growth of Plants." Prof. W. P. Bottomley.
Bristol Photographic Club. "The Alps of Savoy and Valais." Mr. A. Coles.
Ilford Photographic Society. "Oil Transfer Process." F. T. Coupland, B.A.

Thursday, February 14.

Liverpool Amateur Photographic Association. "Studio Portraits and Figur Studies at Homes." E. H. Burnett.
Hanley Photographic Society, Y.M.C.A. Members' Night. A. Hawley.
Hull Photographic Society. Excursion Reminiscences. J. W. Atkinson.
Stockport Photographic Society. "The Town We Live In." H. A. Potter.
Hammersmith (Hampshire House) Photographic Society. "St. Valentine's Day." T. H. B. Scott, F.R.I.B.A., F.R.P.S.
Rodley and District Photographic Society. "P.O.P. Printing and Toning." W. Barrons.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, February 5, the President, Mr. John H. Gear, in the chair.

A lecture was delivered by Mr. F. F. Renwick on the "Relations Between Optical Intensity and Quantity of Deposit in Prints." When the paper was printed he said he proposed to alter the title to "The Covering Power of Pigments, with Special Reference to Photographic Prints." This covering power was a most important matter not only in photography but in many other subjects. In a general way it was familiar to most people; white lead, for example, had good covering power as a very thin coating, and would obscure the surface on which it was laid; while barium sulphate, some of the substitutes for white lead, and other pigments did not cover well. A deposit of finely divided silver had, perhaps, greater covering power than most other pigments, but that process varied according to the conditions under which the deposit took place. Practical men had long recognised that, and by trial and error had made themselves acquainted with the conditions which governed the value of the deposit. The lecturer believed himself to be the first photographer to investigate the subject in a quantitative manner in his paper on the under-exposure period in theory and practice. This paper was followed by that of Messrs. Jones, Nutting, and Mees on the sensitometry of photographic papers; but whereas these gentlemen, dealing with the theoretical side of the subject, made allowance only for the three factors—the reflecting power of the paper, the reflecting power of the surface, and the absorbing power of the pigment—he proposed to introduce and allow for another factor, which might be regarded as of great importance, namely, the reflecting power of the pigment itself. Along these lines the lecturer proceeded to develop a theoretical solution of the problem of a somewhat complicated character, which, however, was shown to be capable of simplification and testing by practical measurements. The results presented appeared to bear out the author's contention.

In the discussion which followed, Mr. W. B. Ferguson referred to the difference between the pigment in an engraving and in a line drawn in Indian ink. They might appear to be equally black, yet everyone felt that there was a difference in the value of the colour. Mr. J. W. Lumb said the lecturer's methods of exposition were so clear that he beguiled even those who had no knowledge of the subject into thinking that it was one with which they were intimately acquainted.

At the close of the meeting the heartiest thanks of those present were tendered to the lecturer.

Stalybridge Photographic and Scientific Society.—The seventh annual general meeting was held at headquarters, Astley Cheetham Public Library, Stalybridge, on Tuesday, January 29, Mr. J. Lees presiding. Officers elected for 1918 are:—Patron, Col. Sir John Wood, Bt., M.P.; president, W. H. Rhodes; vice-presidents, Ald. A. Bottomley, Councillors J. G. Lowe, Mrs. Summers, P. Talbot, M.B., F.R.C.S., T. Cook, Canon J. G. Bird, Dr. G. B. Howe, D. Innes, D. McLaren, and R. Ridgway; hon. secretary, W. Harwood; assistant hon. secretary, J. Welch; hon. treasurer, C. H. Moore; auditors, C. T. I. Garner and J. Lees; committee, J. Batty, S. Beaumont, J. K. Gartside, Sergt. F. Hilton, J. H. Holland, J. S. Kershaw, J. Lees, Sergt.-Major C. H. Mortlock, J. W. Pickering, A. J. Parry, J. Taylor, W. Whitehead; lanternists, J. Batty, J. Welch, G. Sykes, R. Longbottom; Lancashire and Cheshire Photographic Union delegates, J. S. Kershaw and J. Welch.

News and Notes.

Death of an Old Photographer.—Aldeburgh has lost one of its oldest inhabitants by the death on Thursday, January 24, of Mr. John Charles Clarke, artist-photographer, who had reached the mature age of ninety years (within two months). Mr. Clarke worked for most of the nobility around Norfolk and Suffolk, and his miniature work was greatly praised. Even at his great age he recently painted some exquisite miniatures on ivory, a fine art for which he was justly celebrated. He passed peacefully away at Dalkeith House, High Street.

Photomicrographic Society.—The next ordinary meeting of the Photomicrographic Society will be held on Wednesday, February 13, at King's College Bacteriological Laboratories, 62, Chandos Street, Charing Cross, W.C., at 7 p.m., when Prof. W. B. Bottomley will give a lecture entitled "Some Effects of Micro-organisms on the Growth of Plants." This lecture is of special interest, and visitors are cordially invited. Cards of invitation may be obtained on application to the hon. sec., Mr. J. G. Bradbury, 1, Hogarth Hill, Finchley Road, N.W.4.

Liverpool Photographic Association.—It is not perhaps generally realised that the Liverpool Amateur Photographic Association, which is now holding its annual exhibition of members' work at its rooms, 9, Eberle Street, Dale Street, is the oldest photographic society in the world, having been founded in 1853, and ante-dating the Royal Photographic Society by a few months. The first photographic journal to be published was the official record of the Liverpool Association, and so important and wide-spreading became its influence that its offices were moved to London, where it exists to-day as The British Journal of Photography.

Royal Institution.—A general meeting of the members of the Royal Institution was held on February 4, Sir James Crichton-Browne, J.P., F.R.S., treasurer, in the chair. Mr. J. Turner MacGregor-Morris and Professor Paule Popovic were elected members. The secretary announced the decease of Sir John Wolfe Barry, member of the Royal Institution, and a resolution of condolence with the relatives was passed. The managers reported that Dr. Mond, under the conveyance and deed of trust of the Davy Faraday Research Laboratory of the Royal Institution, covenanted to pay to the Royal Institution before the year 1926 the sum of £62,000 as endowment fund. The trustees have in the most generous way anticipated the obligation by eight years, and have transferred the sum of £66,500 in 5 per Cent. War Stock to the trustees, nominated by the managers, of the Davy Faraday Research Laboratory Endowment Fund. This will add materially to the income available for the purpose of promoting and maintaining the efficiency of the Davy Faraday Research Laboratory in the advancement of original research in chemical and physical science.

Deaths from Process Acid.—A remarkable accident, in which two men lost their lives through the breaking of a carboy of nitric acid, occurred at the André Sleigh and Anglo Engraving Company's premises, Milford Lane, Strand, last week. The carboy was found to be cracked, and the acid was running over the floor in the neighbourhood of the gas-meter. Dense fumes were rising, but in spite of this Mr. W. A. Stevens, the assistant general manager, Mr. William Beer, the storekeeper, and Mr. Wise, the works manager, pluckily took steps to prevent the acid reaching the meter, which might have caused a disastrous explosion. Having stopped the risk of this danger, they resumed their ordinary work, feeling no ill effects. An hour or so later Mr. Stevens and Mr. Beer became ill. They went home, and both died on Saturday. "It is a most unusual case," said Mr. Edward Hunter, the managing director of the firm, to a *Daily Graphic* representative. "During twenty years' experience of photographic work I have had several similar accidents with nitric acid and been none the worse. It is possible that the acid came into contact with a zinc dustbin or some other metal, which caused it to give off deadly fumes."

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

DEVELOPER POISONING

To the Editors.

Gentlemen,—I have suffered from this for years, and have tried every remedy (including the ones which have appeared in the "B.J." from time to time), with no result.

Having an ointment for rheumatic pains in the house, I thought I would try it, and was delighted next day to find the huge gashes on my hands healed and almost free from pain. In three days my hands were in splendid condition, and our young lady bromide printer is also cured. The prescription is:—Ung. Methyl. Salicyl. Co., B.P.C. ℞ Methyl Salicylate, 7; Menthol, 15; Lanoline Hyd and [illegible] 35. Mixture I apply before starting work and afterwards wash hands in soft soap, and then bathe them in dilute citric acid. I can now dispense with the sticking-plaster which I have had to use for years. The enclosed prescription is one well known to chemists as a cure for rheumatic pains.—I am, yours faithfully,

C. M. Foster.

A NEW PATENTS AND DESIGNS BILL.

To the Editors.

Gentlemen,—A Bill as above has recently been introduced into the House of Commons. One of its chief objects is to improve that part of the present (1907) Patents and Designs Act which relates to the working in this country of patented inventions. It is, therefore, more particularly of interest to the manufacturing world.

Some of the principal features of the new Bill are very briefly referred to below.

Under this Bill any person interested may at any time present a petition alleging that the monopoly rights have been abused in any of the following circumstances:—

(a) After the four years the invention (being one capable of being worked in this country) is not being worked here on a commercial scale, and no satisfactory reason can be given for non-working; but if there has not been time to work the invention on a commercial scale the petition may be adjourned for a period sufficient to enable this to be done.

(b) If the commercial working of the invention here is being prevented or hindered by importation.

(c) If the demand for the patented article here is not being met to an adequate extent and on reasonable terms.

(d) If, owing to the patentee's refusal to grant a licence upon reasonable terms, any existing industry here or the establishment of any new industry here is prejudiced, and it is in the public interest that a licence should be granted.

(e) If any industry is unfairly prejudiced by conditions attached by the patentee to the working of the invention.

On being satisfied that the allegations of the petition are proved, the Comptroller may exercise any of the following powers:—

(a) He may order the patent to be endorsed with the words, "licences of right" (as to which see below). If this is done, every existing licensee shall be entitled to surrender his licence for one to be settled by the Comptroller in like manner as if the patent had been so endorsed at the patentee's request. Such an order may be made notwithstanding that there may be an agreement subsisting which would have precluded such endorsement at the patentee's request.

(b) He may order the grant to the petitioner of a licence on certain terms. The patentee may be called upon to take steps to prevent infringement, and if he refuses or neglects to do so within a month the licensee may institute the proceedings, making the patentee a defendant.

(c) If the Comptroller is satisfied that the invention is not being worked on a commercial scale here, and cannot be so worked without capital, for the raising of which it will be necessary to rely on the patent monopoly, he may, unless the patentee or those claiming under him will undertake to find such capital, order the grant to the petitioner or any other person able and willing to provide such capital of an exclusive licence, subject to certain provisions.

(d) He may revoke the patent either forthwith or after a reasonable interval, unless in the meantime such conditions as he may prescribe, with a view to preventing the abuse of monopoly rights, are fulfilled.

(e) He may decide to refuse the application.

The granting of an exclusive licence may be made conditional upon the licensee giving proper compensation for any money or labour expended by the patentee or any existing licensee in developing or exploiting the invention.

"Licences of Right."

The salient features of "licences of right" (which are new to patent legislation) are briefly as follows:—If the patentee so requests, the Comptroller shall endorse the patent with the words, "licences of right," if satisfied that the patentee is not precluded by contract from making the request, and thereupon:—

(a) Any person shall at any time be entitled, as of right, to a licence upon such terms as, in default of agreement, the Comptroller may settle.

(b) In settling the terms the Comptroller shall be guided by the following considerations:—

(i) He shall, on the one hand, endeavour to secure to the patentee the maximum advantage consistent with the invention being worked by the licensee at a reasonable profit here.

(ii) He shall, on the other hand, endeavour to secure the widest possible user of the invention here consistent with the patentee deriving a reasonable advantage from his patent rights.

(iii) He shall also endeavour to secure equality of advantage among the several licensees, and for this purpose may, if he considers it advisable to do so, reduce the royalties or other payments accruing to the patentee under any licence previously granted.

In considering the question of equality of advantage, account is to be taken of any work done or outlay incurred by any previous licensee with a view to testing the commercial value of the invention, or to securing its working on a commercial scale here.

(c) The licensee may prohibit importation of the goods.

(d) Every licensee shall be entitled to call upon a patentee to take proceedings to prevent infringement, and if the patentee refuses or neglects to do so within a month, the licensee may institute such proceedings in his own name, making the patentee a defendant.

(e) If the infringing defendant is prepared to take a licence upon terms to be settled by the Comptroller, no injunction shall be awarded, and the amount of damages (if any) shall not exceed double the amount which would have been recoverable against him as ~~licensee~~ if the licence had been dated prior to the earliest infringement.

This paragraph shall not apply where the infringement consists of the importation of infringing goods.

(f) Renewal fees on a patent so endorsed shall be one moiety only of the fees otherwise payable.

All such endorsements are to be published for the purpose of bringing the invention to the notice of manufacturers.

If no licence exists the Comptroller may, on the application of the patentee, and of payment by him of the unpaid moiety of renewal fees which have become due since such endorsement, cancel the endorsement, whereupon the patentee's rights and liabilities shall be as before endorsement.

In future patents for articles or substances prepared or produced by chemical processes, or intended for food or for medicinal or surgical purposes, no claim shall be made for the product, substance, or article itself, but only for the special methods or processes of manufacture. In case of any patent for an invention intended for or capable of being used for the production of food or medicine or surgical appliances, the Comptroller shall, unless he sees good reasons to the contrary, grant to any applicant a licence limited to the use of the patented method or process, and with a view to making the food, medicine, or surgical appliance available for the public at the lowest possible price, the royalty or other consideration shall be fixed at such an amount as will secure to the patentee the minimum profit consistent with his deriving a reasonable advantage from his patent rights.—Yours faithfully,

H. T. P. GEE, Associate I.E.E.,
Patent Agent.

25, Victoria Street, S.W.1, and 70, George Street, Croydon.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

LENS.—Both are lenses of the highest grade, but neither is specially a portrait lens. 130 mm. is the focal length—in English measure 5⅛ inches.

A. G. B.—We certainly think that the Howellite inverted mantle is worth while putting in in place of any upright pattern that we have used. If you get the Howellite burner itself from Griffin's, we should say that any decent tinsmith could fix it suitably upon the ordinary lantern tray.

PITCH FOR FIXING DISHES.—Should plain pitch, run in the joints of a wood box, used for fixing bromide prints, have any injurious effect on them?—CURIOUS.

We should prefer not to use it if it could be avoided. Any hurt it may do will be simply mechanical in the way of dirtying the prints, but usually such wooden fixing dishes are best made with good rivetted joints which require only a little white lead to make them watertight.

ASPECT OF STUDIO.—Will you kindly give me your opinion which would be the best aspect for building a studio—a somewhat obstructed north light, or a more open due east light? Should I be troubled with the sun in latter case?—LEX.

It is impossible to say which would be the best aspect without knowing the nature of the obstruction on the north side. The sun might give trouble in the east light, but you could overcome that by having thin white blinds all over the roof to cut off the direct rays, using the dark ones as usual.

D. W. J.—The method of using the autograph camera is to write the name of the subject on the strip of film which is disclosed underneath through the slot on the camera back with the stylus provided, and then to hold up the slot to bright light for a second or two. You should write to the Kodak Co., Kingsway, London, W.C.2, for a circular which will tell you all about the autograph back. A very good book on photography for beginners is one by F. T. Beeson and A. Williams, published by Messrs. Nelson at 1s. Any bookseller could get it for you.

WASHING CARD STRIPS.—Could you oblige me with name and address of makers of a washer suitable for washing postcards in strip (six on), requiring no attention, that could be used in an ordinary (bathroom) bath, or suggestion of a reliable method of washing strips?—M. B.

We do not know of any appliance specially designed for this purpose other than the floating clips used for washing films. Strips of card can be treated like roll film. Fix a Jaynay clip at each end of the strip and then put into the bath. If necessary, the strip can be lightly weighted to keep it under the water.

BLACKING TINFOIL.—Can you, through "Answers to Correspondents," tell me of a method for chemically staining tinfoil black? I have a 3 by 1 ebonite tray for use on the stage of microscope when looking over for animiferous material. This I wish to coat (or cover) with tinfoil on account of electrical disturbance, but the tinfoil must be black. If you can help me, I shall be grateful.—G. T. H.

We cannot suggest any reliable chemical method of blackening tinfoil, and would consider your best course to be to coat it with a good dead black, such as the Vanguard Company's Nigrogene.

PASTEL COLOURING.—I am anxious to take up pastel colouring on bromide basis, but cannot get the crayon or pastel to adhere in any body to the print. The colours will only bite on the bromide surface in very faint tints, not sufficient to cover up the photographic look of the picture. I have tried several grades of bromide paper, including a nice eggshell surfaced cream crayon, which is a very suitable colour for this class of work.—T. A.

As far as we know, no method of making pastels adhere to the surface of bromide enlargements to the extent you require has been published, but we have found it to be a good plan to thoroughly damp the surface of the print, blot off all superfluous water, and then to apply pumice powder all over the surface with a large camel-hair brush. The print is allowed to dry and the surplus powder dusted off. By this means you can work even on glossy papers. If this is not sufficient, you might try washing the damp print with diluted Higgins' mountant and dusting on a coarser pumice powder, such as you buy at the oilshops. This should give enough tooth for anything.

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SUMMARY.

We regret to have to announce the death on active service of a member of our publishing staff. (P. 80.)

In the third and concluding portion of the article by Mr. Orange on scientific design in optical projection the author deals with the cinematograph shutter in relation to the film, and discusses the advantages and disadvantages of alternative positions. (P. 78.)

In a leading article we go into the question of what may reasonably be called "permanence" in a photographic print. This degree of permanence in any one process apart from the admittedly permanent carbon and platinum prints is largely conditioned by the care and experience exercised in its working. (P. 74.)

The manufacturers of dry plates have announced a further increase in the price of plates. (P. 81.)

The allied question of covering power and illuminating power of lenses recently dealt with by Mr. Graham M. Nicol is further enlarged upon in fuller detail by Mr. C. Welborne Piper, who describes a method of testing in the camera. (P. 76.)

The use of the iodine reducer has been investigated by two German experimenters, who recommend very weak solutions of iodine followed by hypo in preference to the iodine-cyanide reducer. (P. 82.)

Experiments on possible regenerators of hypo have up to the present yielded no results. (P. 74.)

Uniformity in the temperature of all solutions is better obtained by keeping the dark room at a constant temperature, and is a safeguard against getting any one of them too warm. (P. 74.)

The annual general meeting of the Royal Photographic Society took place on Tuesday last, when Dr. Atkin Swan was elected President in succession to Mr. John H. Gear. (P. 80.)

Some hints that may help to minimise the trouble usually connected with keeping qualities of amidol will be found on page 73.

Plate sizes, fixing power of hypo, and the correction of a prescription given by a reader in last week's issue form the subject of correspondence on page 82.

In a note on the photographic industry in Germany, it is announced that the results of the 1917 trade are considered satisfactory. (P. 79.)

The election of a new secretary and treasurer to the Photographic Convention in place of the late Mr. F. F. Bridge took place last week. (P. 81.)

A neutraliser for overcoming the disagreeable odour associated with a stale fixing bath is given on page 80.

The importance of taking pains over exposure on line subjects, if the best results are to be obtained, is emphasised in a note on page 73.

Some brief notes on the proceedings of the meeting of the Rontgen Society will be found on page 81.

EX CATHEDRA.

The Royal Photographic Society. The chief items disclosed in the balance-sheet which was presented to members at the annual general meeting of the Society on Tuesday evening last were those relating to the exhibition. The latter, it will be remembered, was held last autumn at the Society's house in Russell Square instead of at the Suffolk Street Galleries. Thus, the rent of the latter, £105, had to be paid without the compensations in the way of admission money and charges for wall space, which the venue in the West-end afford—to the amount of £200 in round figures. However, on the President's initiative, a "whip round" among the members resulted in the collection of a special fund of over £220, so that the extraordinary liabilities of the time have been more than met and the exhibition saved from having been a heavy charge upon the general finances of the Society. That such a course is eminently desirable is clear from the increased costs of printing to which the Society, like any concern which publishes a journal, finds itself committed. Nevertheless, it will be a matter for the consideration of the new President and Council whether this is a policy which it is requisite or desirable to repeat a second time.

* * *

Durable Amidol. One of the few disadvantages connected with the use of the amidol developer is the short time which the developer remains in good working condition. The following hints may help to minimise this trouble. It is usually recommended to make the solution of working strength, but this is a mistake. If the developer is made with half or even a fourth the normal amount of water, it will keep much better; it should be diluted to normal strength as required. The water used to dissolve the sulphite should be well boiled and allowed to cool a little before adding the sulphite, the amidol being added when the solution has cooled to normal temperature. There is no advantage in making stock solution of sulphite and adding the amidol in small quantities as required except that the surplus may be thrown away. The mixed developer will keep in working condition longer than the plain sulphite solution does. The keeping qualities of this developer are much improved by the addition of a little potassium metabisulphite; say, one drachm to forty ounces of normal strength solution. There is a considerable difference in the quality of amidol as now sold. The best keeping samples are in bright metallic-looking crystals, which pour freely from the bottle and give an almost clear solution. Other samples, which work well when freshly mixed, are duller in appearance, and cling together as if damp. The solution is dark and turbid when mixed, but clear if allowed to stand: the solution does not keep so long unused nor does it yield so many prints before becoming exhausted.

A Warm Dark Room. We recently commented on the fact that operators, when compelled to warm a developer, frequently overdo it, and so spoil the negatives. It is, in fact, a not exactly easy, and generally very troublesome, operation to warm up a developer to just the right temperature, while the developer is not the only solution that works badly when cold. In practice it is far better to give up attempts to get individual solutions to a uniform standard temperature, and instead to adopt some method of warming the whole room. This can be done without much difficulty nowadays, as numerous types of gas stoves, gas radiators, hot-water radiators, etc., are available, and the cost of running, which need not be great, should easily be balanced by the efficiency gained in working details. The advantage of keeping the room temperature constant is that all the solutions which are stored in bottles, or in use, also keep constant, the one thing not affected being the tap water. This one defect is easily got over by keeping a supply of water, especially for mixing with solutions, also stored in the room. We use a large stoneware barrel or crock fitted with a tap, and so cold water from the main need not be used at all except for washing purposes. The exact temperature of all the stored solutions is recorded by a thermometer kept permanently in a bottle of water, and so long as this bottle shows a fair mean temperature we know that our solutions and water supply are also all right for use.

* * *

Exposing on Line Subjects. The ideal negative of a black-and-white line subject should, of course, show quite transparent lines on a perfectly opaque ground, but these conditions seldom exist in the developed plate, and have to be arrived at by after-processes of reduction and intensification. As a rule it is impossible to avoid a certain amount of veiling or fog over the lines, and so a reducing or "cutting" solution is always necessary, but if the background is not black enough at the start it stands a chance of being so much further reduced by the cutting solution as to render it difficult to get enough opacity, even with a powerful intensifier. The best initial negative can only be secured by taking pains over the exposure. If the time is either too short or too long it is impossible to develop up to blackness, while, in the event of the time being too long, additional veil is thrown over the lines. The exposure must, therefore, be rather nicely adjusted, and at the first attempt it generally pays to make a trial set of exposures in strips. It must, however, also be remembered that we cannot get full contrast in the negative unless it exists in the original, and a black-and-white drawing will not show this full contrast unless it is sufficiently well illuminated. If the light is too dim the drawing will not really be black and white at all, but black and grey, and it will photograph as such, showing transparent lines on a grey ground, instead of a black opaque one. Good light is essential for this kind of work, and, given brilliant lighting and a correctly-adjusted exposure, it is quite possible to get a jet black ground that will need no intensification.

* * *

Reclaiming Hypo. Since the speculative note of last week we have made a few experiments with possible "regenerators" of hypo. The use of sulphide was looked upon as unpractical, as it was obvious that a bath containing sulphide would be a very undesirable fixer, even if it would work at all. All the same, we tried it. The chief precipitants tested were aluminium, zinc, copper, and mercury. The first proved useless at once, as it rapidly decomposed the hypo, setting free sulphuretted hydrogen and bringing down sulphur. Zinc, whether pure or impure, had much the same effect, but acted more slowly. With copper the metal was soon plated with a loose coating of silver, while the solution remained quite clear and apparently unaffected. With mercury an amalgam of silver was formed, the solution remaining clear. In one set of tests twenty-two quarter-plates were fixed out in 8 ozs. of 20 per cent. hypo, the result being that the time of fixation was increased in the proportion of 5 to 3, while in another set 1 grain of silver bromide was dissolved in every ounce of 20 per cent. hypo, this addition raising the fixing time in the ratio of 8 to 3. The results were entirely negative. No method of treatment in any way increased the rate of fixing, and so it became evident that the amount of active hypo present was not altered in any way. In cases where pure silver alone is abstracted it seems that it is probably replaced by the metal used, while when silver sulphide is formed the hypo itself is changed to another compound. Incidentally it was shown that zinc and, above all, aluminium were most unsuitable metals to be brought into contact with hypo. The users of zinc developing tanks will be wise to avoid developing and fixing in the same tank.

DEGREES OF PERMANENCE IN PHOTOGRAPHIC PRINTS.

In these days when processes which yield prints of unquestioned permanence such as carbon and platinum form only a small proportion of the immense output of photographs of various kinds, and when also many different methods of toning prints by other processes are adopted, the question of permanency is one which has an interest for every photographer, and is, morever, one of which a photographer who sells his work needs to have some fairly comprehensive knowledge. It may therefore be of interest to review the question from the point of view not only of making prints of the utmost permanence, but also from that of satisfying customers as to the quality of prints in this respect. In this inquiry it is desirable at the start to obtain some more adequate definition of permanence than its dictionary meaning of "continuance in the same state or without any change which destroys form or character." The dictionary definition does not help us very much. Another which has been proposed is that a permanent photograph is one the image on which will last as long as the paper which supports it. This again is a definition which is incomplete unless certain conditions under which the print is kept are specified. Moreover, it is one which marks too high a standard of permanence. Paper, if of the reasonably good quality which is used for the preparation of photographic printing materials, may reasonably be relied upon to last for a very long term of years. In the case of paper of such high quality as is employed in the making of platinum prints its period of life may be of the order of hundreds of years, and would thus make great demands on the stability of the image. True, a black platinum print possesses an image which is so unalterable that it rivals its paper support in permanence, and justifies the remark of Mr. Chapman Jones (in "Photography of To-Day," p. 196) that "there seems every reason to suppose that if platinum prints had been made in Abraham's time, or when Egypt was at the height of its glory, they might, if preserved with reasonable care, have been available for our information at the present day." Unfortunately such considerations as these will lead us nowhere in the direction of providing a definition of permanence in photographs such as can be adopted for practical purposes under present-day conditions. We think that such a definition is to be found only in some formula representing what the public considers permanence. Opinions will differ, but such a formula is that no marked alteration will be observable in prints, when kept under reasonable conditions, within a period of, say, twenty years. We are now speaking of prints belonging to the vast majority which are bought and sold as portraits, views, etc. Obviously twenty years would be much too short a time for prints in which permanence is a prime desideratum: such prints would be expected to last for fifty or a hundred years. Whatever may be thought of such a definition it provides a useful basis from which to explore printing processes in regard to permanence, and to bring together facts of interest to amateur photographers and of service to professionals in dealing with their customers.

A point which requires first to be touched on is that of what may be termed "permanent" photographic processes, as this phrase is (or was) understood in ordinary speech. In regard to this it may be said that up to within ten or fifteen years ago a photograph by a "permanent process" meant one by either the platinum or carbon process. There is a very good reason why it had this signification, for during the twenty-five or thirty years during which albumenised paper was the printing method in universal use, carbon and platinum prints were the only two forms of photograph which could be said to have established themselves in the esteem of the public as yielding prints of unquestioned permanence, and in this respect were distinguished from the ordinary silver prints with their liability, particularly in later years, to fade. Thus up till about ten years ago it would reasonably be said that in the County Court a permanent print was one in platinum or carbon. And it would then have been easy for the party to a legal dispute to show that such was the general interpretation of the term in the trade. The advent of bromide and other printing papers has done a good deal to disturb that position, and it is very doubtful whether the term "permanent photograph" now has this same significance.

Coming now to some notes on the degrees of permanence in photographic prints, it is important to draw distinctions between them, not on the basis of single specimens which have been proved to have lasted for such and such a number of years, but on one which expresses what is the quality of permanence of the great bulk of prints produced by a given process. There is a sharp distinction between the two. It would be easy to claim exceptional permanence for, say, print-out silver prints on the strength of one or two which remained fresh and good after twenty years. But the essential difference between the admittedly "permanent" processes (carbon and platinum) is that with these it is a matter of difficulty, almost of impossibility, to make prints which are not permanent, whereas in the case of almost all other printing processes the degree of permanence is largely conditioned by the care and experience exercised in working the processes, and thus the real quality of a process as regards permanence must be judged on general experience of the results obtained with it, and not by single examples which may be the result of care and skill which the process would not receive under ordinary commercial conditions.

Leaving now carbon and platinum out of consideration, there can be no doubt that the most permanent form of photograph among the papers available at the present time is that on a bromide or gaslight paper. Such a print, if properly made and mounted and preserved under suitable conditions, should amply fulfil such a requirement, as regards permanence, of twenty years' life. The effect of time upon it, when it is mounted and framed, should never be more than a slight yellowing of the whites, and need not necessarily be that. By exposure to the products of combustion from gas or stoves such prints are liable to exhibit, in the course of time, a bronzed or semi-metallic deposit, chiefly in the shadows, which is a certain disfigurement, but not one which could be reasonably called impermanence. The same effect is to be noticed when prints on these papers remain in contact with ordinary printing paper as they do when inserted in books. Such action appears to be due to matter in the paper with which the photograph is in contact, and plenty of evidence as to the regularity of the effect is to be found in the prints which formerly, from about the year 1887, were inserted in the "B.J. Almanac." In some cases this bronzing or solarization has reached a point at which it is a marked disfigurement: in other cases it is accompanied by pronounced yellowing of the whites.

A sulphide-toned bromide, however, is less liable to this bronzing, and for the very plain reason that the bronzing is a species of slow sulphiding, and, if the sulphiding process is carried out thoroughly when toning, there cannot be the opportunity for its often irregular appearance in process of time. In this respect undoubtedly sepia prints made by the bleach and sulphide process are superior to those yielded by hypo-alum and similar toning processes in which the sulphiding action is not carried to a point of completion. Generally speaking, sepia bromides, by either process, may be considered as of a higher degree of permanence than the untreated black-and-white prints. We do not think that the same can be said of the warm-toned prints which of late years have come rather more into use and are produced by treating the sulphide-toned prints with a gold toning bath. Attractive as these effects are, we think there is evidence to show that they are somewhat susceptible to change by exposure to light. The change is small—some years ago we found that some months' constant exposure to ordinary daylight was necessary to produce a distinct change—but the liability does certainly exist. Of other toning processes which, before the sulphide method became popular, were largely employed, it is not possible to speak in the same terms as of sulphide-toning. Prints toned with copper or uranium are exceedingly liable to exhibit, in the course of a year or two and often sooner, bronzing and other disfigurements which are of a degree such that the purchaser of a print would quite reasonably object to. Our experience of prints toned with Schlippe's salt is small, not enough to justify us in expressing a positive opinion; our inclination is to place them in a category somewhere between those sulphide toned and those treated by one or other of the processes just mentioned.

Coming to what are sometimes called even nowadays "silver" prints, those on ordinary P.O.P. require to be placed in a lower class as regards permanence than black-and-white bromides. They are appropriately so classed when toned by the best method, namely, the use of a separate gold bath followed by fixing. Although in theory the use of a combined toning and fixing bath should yield prints which are just as permanent as those separately toned and fixed, there can be no doubt that P.O.P. prints by the combined method rightly rank still a little lower. In regard to those toned with platinum, a process which deservedly has now largely gone out of use, the results were often of a very low degree of permanence indeed: apparently the use of any platinum toning bath on a gelatine paper yields results which cannot be depended upon for permanence. The other variety of silver printing paper, viz., self-toning, may, we think, be broadly classed, without injustice to it, with the results obtained on ordinary P.O.P. by the combined bath. Here experience is somewhat conflicting, probably for the reason that self-toning papers, being chiefly used by amateurs, are not always handled under the best conditions for working which papers secure in professional establishments. Still, we think that general experience is to the effect that their permanence is a little inferior to that of P.O.P. toned in the separate bath. A distinction must also be drawn between gelatine and collodion self-toning papers; there seems no doubt that those of the latter class are superior to those of the former in stability. Of the remaining type of silver printing paper, namely, collodio-chloride or C.C., there is greater divergence in the matter of permanence than in the case of perhaps any other paper. The impermanence in this case takes the form not usually of general fading or yellowing, but that of the appearance of spots often within a very short time of the prints having been made. Worked under the best conditions and with the fullest knowledge of the precautions which are needed in its manipulation, C.C. paper is no doubt capable of yielding prints which are the equal, if not the superior, of those on ordinary P.O.P. toned by the separate bath. But in less skilled hands its results have often proved to be positively fugitive, a chief cause no doubt being the necessity of removing all traces of the acid platinum toning bath before the prints are passed on to fixing.

In concluding these notes we should revert for a moment to the platinum printing process of which we have spoken above as though its results were invariably of the very highest degree of permanence. An exception to this general statement needs to be mentioned. While nothing in the way of a photographic image is more permanent than that of a black platinum print, the same cannot be said of all platinum prints of sepia colour. Methods of introducing a greater or less degree of warmth by additions of mercury, etc., to the developing bath when using the black paper almost all of them represent a sacrifice of undoubted permanence to pleasing appearance. Also, we think it may be accepted as true that for really permanent sepia results on the papers especially manufactured for this effect hot development is an essential factor. Such is the method adopted for the sepia paper of the Platinotype Company, and both chemical tests and those of time fully prove that the results are permanent. Equally we have in our possession plenty of examples of sepia platinum prints in the making of which the method adopted has been that of cold development on papers manufactured for use according to this system: they show the pronounced fading which is the result of ordinary exposure in moderately lighted rooms over a period of years which is not more than ten at the outside. Palladiotype prints, recently come into use as the result of the restriction on platinum, presumably are just as permanent as those by the ordinary platinum process. This is only an inference from the known properties of palladium metal, but it is no doubt one which experience, as time goes on, of palladiotype prints will confirm. We have not referred to oil or Bromoil prints or those transfer effects obtained by taking impressions from these latter. Obviously such prints possess exactly the permanence of the inks which are used for pigmenting. There is no reason whatever why these inks should not be fully permanent, and therefore such prints, both from the nature of the pigment which forms the image and from that of the medium which hold it, deserve to rank as fully the equal as regards permanence of those by any process.

COVERING POWER AND ILLUMINATING POWER OF LENSES: TESTS AND PERFORMANCE.

A recent article by Mr. Graham M. Nicol, on the covering power of lenses, raises some points with regard to lenses that are certainly not generally understood, though their practical importance is very great, and some of these points are well worth more detailed consideration. The first to demand special attention is the distinction between covering power and illuminating power. The best way to realise this is to take an ordinary quarter-plate R.R. lens and fix it up temporarily on the front of a large camera, 12 by 10, if available. First of all, open the lens out to its biggest stop aperture, and secure approximately sharp focus on the screen on any object at a reasonable distance, say 20 ft. away. Now remove the focussing screen and look obliquely through the lens. At a certain angle it will be seen that no light is transmitted at all, the two sides of the visible aperture apparently closing together and cutting out all light. Obviously this angle must mark the limits of the largest possible circle of light that the lens can project upon the plate. Next look through the centre of the lens. A perfect disc of light is then seen, but as we move the head sideways this contracts to an ellipse. At a certain angle this perfect ellipse changes to an imperfect one, with pointed instead of rounded ends; in fact, to the shape of the aperture formed by sliding two elliptical openings over one another, but not allowing them to coincide. This change in form is due to the lens mount interfering with the light. Up to this point we simply had an oblique view of a circle, which is an ellipse. We now have an oblique view of parts of two circles which apparently intersect, one being the circular stop aperture and the other the circular lens mount. The angle at which this change takes place is obviously the one limiting the illuminated disc which can be produced by light passing the full unobstructed stop-aperture of the lens, and this circle it is convenient to call the circle of full illumination, while the other may be called the extreme circle of illumination.

Suppose, now, we reduce the stop of the lens. It will be found, on trial, that the circle of full illumination has enlarged, though the extreme circle has not changed. If, however, we change the R.R. for a lens of unsymmetrical construction, the extreme circle will also change: it will become smaller as the circle of full illumination becomes larger if we use the type of lens called the single landscape. What happens to the extreme circle is, however, of small moment, for in any case the illumination near its boundary is so faint as to be photographically of no value. In fact, it is almost impossible to record its limits.

As the ellipse shown by a circle viewed obliquely is necessarily of smaller area than the circle itself, it follows that at the margin of the circle of full illumination the light is rather less than it is at the centre. The diminution is not much, and as the ordinary plate has considerable latitude it is not beyond its capacity to render this really graduated disc as if it were a uniform one. If, however, we go outside the circle of full illumination the visible aperture is very rapidly and materially cut down by the lens mount, and sooner or later we reach an angle where the production of a uniform disc on the plate is impossible. The limits of this angle depend a good deal on the plate and on the exposure, for a plate with great latitude will permit considerable over-exposure in the centre without showing it. Under-exposure on any kind of plate will show a very small uniform disc, but if that plate will permit a considerable increase without spoiling the centre of the image a larger disc of uniformity can be produced. Leaving out the question of plate and exposure makes it difficult, if not impossible, to define the limits of the angle, but seeing that many plates will permit a doubling of what is really a correct exposure, without showing over-exposure, it is convenient to define the circle of uniform illumination as limited by the angle at which the pointed ellipse representing the lens aperture is half the area of the complete circle seen centrally. This angle is termed the angle of semi-illumination, but it should be understood that the definition is a more or less conventional one, probably not far from the truth in most circumstances, but almost certainly well away from it in others.

An actual test giving varied exposures is the only way of arriving at the true maximum limits, and if we start with a very short exposure such a test will be very interesting and instructive, though somewhat expensive. The facts can be illustrated in cheaper fashion by using bromide paper, but the result will afford no criterion of the effects producible on a well-coated negative plate, as the bromide paper has no latitude at all in comparison. It should be observed that with nearly all large-aperture lenses the circle of full illumination is very small; with many not much bigger than half-a-crown. The most rapid and highest class anastigmats will produce much the bigger circles, but in practically all cases we use plates that require still bigger circles to cover them, so the practical limits are always outside that of the circle of full illumination and near that of semi-illumination. This circle also enlarges as the stop is reduced, and not uncommonly we are compelled to stop down to get sufficiently uniform illumination over the plate in use.

It will be noticed that in considering this matter of illumination, as it affects the area of a plate, we are almost obliged to bring in the word "cover," for none other seems to serve. The term "covering power" may be used in this connection, but it is best not so to use it, for in lens catalogues usually this expression does not imply the size of the angle or circle that the lens will cover with uniform illumination, but that which it will cover with good definition, a different matter altogether, and one quite unconnected with the other. Unfortunately, this conventional definition is not always observed, and so confusion has arisen. Some very good lenses have very small covering power compared with their power of illuminating a plate uniformly, and this may be no disadvantage, but it would be a somewhat awkward matter for a dealer to explain to a purchaser whose knowledge of lenses was very limited, and the former could hardly be blamed if in such case he used "covering power" to define the circle of good illumination. An example of such a lens is the Petzval Portrait, which, tested on a plane object, will show very small covering power, but on a suitably curved object will show it to a very considerable extent. The fact is we cannot fairly test all lenses for covering power in the same way. The form of the object surface comes in. An anastigmat or rectilinear may, with more justice, be tested on a plane surface, and the former will have little to recommend it if it does not show a fairly large circle, bigger than any R.R. can produce in the same conditions and much bigger than that which a Petzval may show. But always the type of lens and the purpose for which it is required must be considered. Just as the size of the circles of full and semi-illumination increase as the stop is reduced, so also should the circle of good definition, if the lens is at all a reasonably good one. The most serviceable lens is one that with a moderately small stop will cover the plate with both even illumination and good definition, and one of the most important differences between good anastigmats and R.R.s is that the former will do this with much the larger stop, the result being that as a rule they require only a half or one-third the exposure. This brings me to another of the points referred to by Mr. Nicol. He mentioned several cases in which R.R.s would serve just as well as anastigmats, and several ways in which photographers could waste money on expensive lenses when cheap ones would have done all they required. The fact seems to be that many photographers do not quite understand what is meant by a high degree of correction in a lens, and place a value on it that their requirements do not justify. First of all, we must premise that no lens is perfectly corrected. If we test two lenses, an R.R. and an anastigmat, at a certain moderately oblique angle, and use a critical test, we shall find astigmatism in both of them. It may be clearly obvious in the first lens and only just perceptible in the other, but it will exist. Clearly the anastigmat is the better corrected, but still not theoretically perfect. Next test both lenses by exposure on a test subject. The chances are that the aberration is not visible in either. The small defect that our microscopic test revealed is marked by the inherent defects of the photographic process. A minute spreading of the light-effect, or lack of sufficient resolving power in the plate, or perhaps lack of minute detail in the subject, has rendered the lens defects quite invisible, and, therefore, negligible. It is then evident that the R.R. is doing the work quite as well as the photographer can desire, while the anastigmat is merely an instrument of greater precision than he needs. At bigger angles he will find marked differences, while always the anastigmat should be the quicker lens, but if he does not use wide angles or short exposures he can do without the anastigmat quite easily.

Yet another point is that the special advantages of the anastigmat are often arrived at by various means of compromises. A little of the critical definition possible in the centre of the field is given up for the sake of getting something more important. It has been said that for fine central definition no lens yet made comes up to the Petzval Portrait, while it is certainly a fact that some good R.R.'s will give central definition of a kind that should satisfy the most critical photographer. Somehow or another, when an extremely fine focus is required, even though on only quite a small area in the centre of the field, the tendency seems to be to rush for an anastigmat, when all the time a much cheaper lens would do the work just as well and very possibly even better.

C. WELBORNE PIPER.

EASTMAN KODAK COMPANY OF NEW JERSEY.—In addition to the usual quarterly dividends of 1½ per cent. (being at the rate of 6 per cent. per annum) upon the outstanding preferred stock, and of 2½ per cent. (being at the rate of 10 per cent. per annum) upon the outstanding common stock, the directors of the Eastman Kodak Company of New Jersey have declared an extra dividend of 7½ per cent. upon the common stock, all payable on April 1 to stockholders of record on February 28.

REGIMENTAL BADGES AND RELIEFS.—We have seen a good many embellishments for the mounted photographs of those in one or other of the Services who have taken an honoured share in the war, but none which can be compared in artistic production and in the rich yet dignified character which they bear, with a series which is being issued by the Badge and Colour Relief Company, 73, Cotton Lane, Moseley, Birmingham. The distinguishing character of these is that the badge is not only in several colours (reproducing with great fidelity the colours of the original), but also the relief of the original is in a very great measure reproduced, and gives to the whole badge an appearance of quality and distinction which is not secured by any form of reproduction in the flat. At present the only badge and ribbon which are obtainable are those of the Royal Flying Corps, but the Badge and Colour Relief Company are in hopes of adding other branches of the Service to their list as rapidly as manufacturing facilities will permit. In the meantime, it is certainly worth while for any maker of portraits who desires to obtain a badge which will be a distinction to a mounted print of however high a character, to apply to the Company for particulars and prices.

SCIENTIFIC DESIGN IN OPTICAL PROJECTION.

III.

[A week or two ago we quoted from a paper before the New York Society of Illuminating Engineers on a system of regulating illumination upon the projection screen in accordance with the conditions which make for the optical comfort of an audience. A further paper before the same Society now deals with a subject which has a much more important bearing upon optical projection inasmuch as it is an investigation, as regards effective illumination of the projection screen, of different systems of illuminating the lantern slide or other transparency. The author, Mr. J. A. Orange, of the General Electric Company, is presumably interested in showing the superior results which can be secured by means of some metallic filament lamps used in accordance with an optical system which is quite different from that hitherto employed for other light-sources, such as gas mantles, Nernst, and arc lamps. But as it appears that the use of a metallic filament lamp for optical projection is being actively developed and promises to revolutionise the construction of optical lanterns, a study of the principles of projection as set forth by the author is certainly to be recommended to those who, after the war, will be returning to the manufacture of these largely sold articles. The metallic filament lamp has much to recommend it on the score of convenience and constancy in comparison with an arc, and if it turns out that its introduction for projection purposes is the occasion of displacing the familiar type of lantern condenser from the vogue it has enjoyed for many years past, it is obviously necessary that constructors in this country should keep before them what progress is being made in this direction.—Eds. B.J.]

After this preliminary account of motion-picture projection, simplified by omission of all reference to moving parts, one is in a better position to review the actual requirements.

Standard practice involves the showing of sixteen pictures per second, each picture being held stationary in the proper position for about 5-6 of the working period of 1-16 second.

It is necessary to interrupt the projection during the short intervals in which the film is moving, and further, since flicker is intolerable at 16 alternations per second, it is customary to interrupt the projection 32 or 48 times per second. (Thus for the latter case a cycle would be:

1-16 × 1-16 sec., film moving, projection interrupted.
1-16 × 1-16 sec., film stationary, projection proceeding.
1-16 × 1-16 sec., film stationary, projection interrupted.
1-16 × 1-16 sec., film stationary, projection proceeding.
1-16 × 1-16 sec., film stationary, projection interrupted.
1-16 × 1-16 sec., film stationary, projection proceeding.)

The necessary interruptions are effected by the rotation of a shutter, a circular disc with sector openings, at a suitable position in the path of the light. A 2-wing shutter revolving 16 times per second gives 32 interruptions, and a 3-wing 48.

The only reason for using the 2-wing shutter is found where 60-cycle alternating current is used with an arc-source; were the 3-wing used, its frequency of 48 would give stroboscopic "beating" with the 60-cycle pulsations of the light-intensity. Flicker is known to depend on intensity of illumination *(or more strictly on surface brightness)* as well as frequency. Now, while the intensity used is unlikely to produce appreciable flicker at a frequence of 48, it should be remembered that there is the inherent 16 per second jumpiness of the picture details which are in motion.

This is an argument for restricting the brightness of the projected picture; it would seem that eye-strain may occur with two very different outfits, the alternating-current arc giving relatively low illumination and a frequency of 32, and the very high power direct-current arc giving high illumination, an unobjectionable 48 frequency and a 16 per second jumpiness which is prominent by virtue of the degree of illumination.

The best form of shutter device is a matter of considerable importance. The requirement is that the shutter be closed entirely throughout each interval of motion of the film and yet at the same time that the time-integral of the opening be as large as possible. It follows geometrically that it is desirable to have a shutter which is large compared with the section of the beam in which it operates. A number of alternatives are available:

1. The so-called inside shutter, operating near the film. Since this operates in a very constricted part of the beam, it may be made small and yet reasonably efficient. Apart from the general inconvenience of the position, there is the slight disadvantage that the different parts of the picture are not quite synchronous as regards the pulses of illumination.

2. The standard shutter used with the system which employs a 4-in. condenser opening at long range from the film. This system is characterised by a small image of the condenser-opening a short distance ahead of the objective. The shutter is placed in this image-position, and may then be made small. There is some slight advantage in the fact that the whole picture waxes and wanes in brightness together with this method. The one objection is the stopping (diaphragming) effect of the condenser-image (so to speak), that is, there is a restriction of illumination which is more serious than the gain in shutter design.

3. The remaining case is that in which large condenser-aperture is used and limiting illumination attained. The inside shutter may be used if one cares to tolerate the inconvenience. Alternatively one would select as shutter position a plane immediately in front of the objective, such being the smallest section of the emergent beam.

The beam section is considerably larger than that utilised in the usual arrangement (2, above), and consequently the shutter should be scaled up in proportion, if efficiency is to be maintained.

Some interesting variations are:—

(*a*) A pair of shutters working in opposite directions through the beam; these can be made smaller than a single shutter for any given efficiency.

(*b*) A small one-wing shutter working at treble normal speed.

Finally, there is a question of choice of light-source for moving picture projection. Theatre work has depended almost entirely upon the carbon arc. It might be thought that the superior brilliancy of the arc would constitute an invincible advantage, but when one examines the optical train used in this work it does seem that a source of lower brilliancy could be utilised, given appropriate arrangements. It is a fact that the majority of objectives in use have a much smaller aperture than might be provided, and moreover, *the stop constituted by the condenser-image is a needless obstacle.* Thus in any particular case the illumination at a screen point, $\frac{AB}{x^2}k$, may be obtained just as readily by increasing A and decreasing B, that is, by increasing the effective aperture of the objective and decreasing the source-brilliancy.

(The contention that large aperture may be coupled with arc-brilliancy and thus still higher screen illumination obtained is of no consequence. The main interest centres in such intensities as are giving commercial satisfaction to-day. The connection between intensity and flicker has also a bearing on this question.)

The extent to which objectives may be improved as regards aperture cannot well be discussed here. Suffice it to say that a certain well known moving picture camera lens has 3-in. (7.5 cm.) focal length and f/1.9 aperture, which gives some indication of the possibilities.

The largest-aperture projection objectives in regular use are about f/2.2. Such an aperture when used in conjunction with a special tungsten lamp and roughly limiting illumination conditions will give screen intensities of the order of those found in present commercial practice. It should be pointed out that the cost of the objective in most existing installations is relatively insignificant. An increased allowance in this respect is very desirable, in view of the importance of its function.

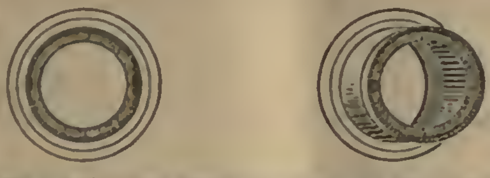

Fig. 6.—Aspect of magic lantern objective from centre and side of screen, showing variation in available aperture.

APPENDIX—MAGIC LANTERN AND MOVING PICTURE CALCULATIONS.

The limiting illumination at any screen point is

$$I = \frac{B \times A}{x^2} \times k \text{ ....(1)}$$

where B is the source brilliancy, A is the apparent opening of the objective relative to the point in question, x is the throw and k is the coefficient of transmission of the system. The apparent opening of the objective often varies in magnitude for different screen points, particularly in the case of the magic lantern. This is analogous to the variation obtained with a window in a thick-walled building, as one travels past, and is known as the vignetting action of the objective. (See Fig. 6.) In general, limiting illumination is not attained, that is, the effective aperture of the objective for any particular screen-point (*and in strictness, for any one spectral colour*) is less than the whole apparent opening or gross aperture, and $I = \frac{a \times B}{x^2} \times k$, where a is the *effective* objective aperture.

From the further relations:

$$\frac{x}{f} = m$$

and

$$\frac{f}{a} = n$$

where f is the focal length of the objective,

m is the linear magnification, and

n is the effective numerical aperture* of objective we obtain:

$$I = \frac{B a}{x^2} k = \frac{B}{m^2 n^2} k \text{ ....(2)}$$

This implies that, other things being equal, magnification and effective numerical aperture* should keep step if constant illumination is required. Hence the amateur's outfit giving a 3 to 6 ft. (1-2 metre) picture is well enough served by an objective working at small aperture, while a theatre outfit giving a 12 to 20 ft. picture calls for proportionately extreme numerical aperture*. This comparison is on a basis of equal film size; if the amateur's outfit uses miniature film then the magnification is necessarily higher, and with it, the lens aperture requirement.

With regard to the common inquiry as to the projection of a fixed size of screen picture at a short throw and at a long, the answer is that different focal lengths of objective will be required, and if these are of the same numerical aperture* the illumination will be the same in the two cases. Since commercial objectives are of fixed diameter, in focal lengths, exceeding a certain moderate value, it will be seen that with relatively long throws the possible illumination at constant picture size varies inversely as the square of the throw.

A third relation which is of interest in testing projectors may be derived as follows:—

$$I = \frac{B k}{m^2 n^2}$$

$$\therefore IS = \frac{B s k}{n^2} \text{ ....(3)}$$

where S is the area of screen picture, and s is the area of film or slide But $1 \times S$ is the number of lumens in the projection beam

$$\therefore L = \frac{B s k}{n^2}$$

N.B.—In equation (1), I and x should involve the same unit of length—foot or metre, as the case may be—and B and A should involve the same unit of area, square inch, square centimetre, or square foot. In equation (2) if I is stated in foot-candles B should be stated in candles per square foot. In equation (3), B and s should involve the same unit of area.

Rough values of the factors which together make up the constant k are as follows:—

Coefficient of transmission of objectives	0.65
Coefficient of transmission of two-lens condenser	0.75
Coefficient of transmission of projector shutter	0.50

ADDITIONAL REFERENCES.

Eppenstein (1), "Die Vergrössernden Projektionssysten" (2), "Die Beleuchtungssysteme," *Handbuch der Physik*, Winkelmann, 1906 ed., pp. 373-75.

Kruss, H., "Uber die Konstruktion von Kondensoren für Vergrosserungs and Projektions Apparate," *Eder's Jahrbuch*, 1899.

J. A. ORANGE.

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[*] The term "numerical aperture" is misapplied here. It is customarily applied to microscope objectives and takes into consideration the refractive index of the media with which the first lens surface is in contact—a factor which is not considered in optical projection calculations. Its meaning, as used by Mr. Orange, is simply "F No."—Eds.

THE GERMAN PHOTOGRAPHIC INDUSTRY IN 1917.—In the first two years of the war (the "Norddeutsche Allgemeine Zeitung" is informed from Dresden), it appeared that the manufacture of cameras, which is regarded more or less as a luxury industry, would have difficult times if the war lasted long. The Dresden firms, which set the tone for the industry as a whole, were exceedingly cautious in regard to the allocation of their profits; they even expected to have to close down altogether. But the adaptability of the camera industry to the war conditions soon dispelled these anxieties; the army authorities utilised photography more and more, and made such demands on the industry that the labour still left was unable to cope with them. For the purpose of carrying out particularly delicate operations it became necessary, therefore, to grant leave from the army to skilled workers. Output for private requirements was, consequently, more and more restricted, with the result that there is a shortage of cameras on the market. Despite a considerable increase in price, the demand is keen, especially from the front. Altogether the industry may be satisfied with the results of the year 1917. Despite unprecedentedly high wages and prices for raw materials, the two Dresden camera works will be in a position to offer their shareholders satisfactory returns. The photographic paper and plate factories will also do quite well, notwithstanding the fact that they have had to contend with an even more serious shortage of materials than the camera factories. Since the middle of 1917, it has been possible to execute trade orders only slowly and in small quantities. Yet there is no marked scarcity of commodities on the market, as the dealers laid in abundant stocks in good time. The anxiety of professional photographers lest they should be adversely affected by amateurs proved groundless, and the proposal to restrict amateur photography found no favour.

Analecta.

Extracts from our weekly and monthly contemporaries.

That Stale Fixing Bath Odour.

THE acid in the fixing bath (writes M. F. Long, in "Camera Craft" for January) frequently keeps the studio perfumed with a dead odour of sourness. This does not bother the photographer, but is always noticed by his customers, who are ignorant of the source and its significance. The addition of a few drops of what may be called a neutraliser to each gallon of the fixing bath has proved a great help in overcoming the trouble. This deodoriser is made by adding a little oil of cloves to some petrol, about ten drops of the oil to each ounce of petrol. This can be altered to suit the taste by using oil of wintergreen or oil of cinnamon, and also by varying the amount of oil used, but it will scent the prints if used too strong. A few drops of the mixture are to be added to the fixing bath whenever the scent of acetic acid is noticed. It has no effect on the working of the bath, but the atmosphere of the workroom and studio is changed and freshened wonderfully.

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DEATH OF LIEUT. E. J. CURTIS.

WE have to record with much regret the death in action on January 22 of a member of the publishing staff of the "British Journal," who was known personally, if not by name, to many of those who had business at these offices. Mr. E. J. Curtis entered the employment of Messrs. Greenwood nineteen years ago. On joining the Army he was for a short time with the Royal Garrison Artillery, being subsequently transferred to the King's Own Rifles. With this regiment in France he took part in heavy fighting in the Somme offensive of last year, and subsequently, on recommendation for a commission, was gazetted second-lieutenant in the Royal West Kents in September last.

Of Messrs. Greenwood's staff, of six eligible for military service,, it may be of interest to say that two—H. S. Mills and P. J. Nix—have been discharged after active service, the one with the loss of an arm, the other from wounds and gas poisoning. Two others—J. W. Aplin and G. T. Pike—are still engaged in the R.N.A.S. and Royal Field Artillery respectively.

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FORTHCOMING EXHIBITIONS.

February 9 to 16.—Glasgow and West of Scotland Amateur Photographic Association. Secretary, G. S. McVean, 125, West Regent Street, Glasgow.

February 16 to March 2.—Edinburgh Photographic Society. Sec., P. T. Mackintosh, 38, Castle Street, Edinburgh.

February 21 to 23.—Leicester and Leicestershire Photographic Society. Sec., H. C. Cross, 80, Harrow Road, Leicester.

March 12 to 15.—Hackney Photographic Society. Sec., Walter Selfe, 24, Pembury Road, Clapton, E.5.

April 18 to May.—Hampshire House, Hammersmith, Photographic Society. Entries close March 19. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12.

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R.P.S. FORTHCOMING LECTURES.—The lecture, "A Few Words on Bromoil," by Dr. C. Atkin Swan, announced for Tuesday, February 19, and the two lectures, "Round About Grassmere," by F. Humpherson, and "Nicholas and Napoleon," by Bertram C. Wickison, announced for February 26, will not be held on these dates. Dr. Swan's lecture will be abandoned, and the other two lectures will be transferred to April 9.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, FEBRUARY 18.

South London Photographic Society. Portfolio Exhibition.

Dewsbury Photographic Society. "Candlelight Effects." H. A. Parkinson.

City of London and Cripplegate Photographic Society. "Bromoil." G. B. Clifton.

Bradford Photographic Society. "Rambles with a Gamekeeper." W. J. Forrest.

TUESDAY, FEBRUARY 19.

Birmingham Photographic Society. "Pompeii." Arthur Clendon, M.A.

Hanley Photographic Society, Y.M.C.A. Midland Photographic Federation Slides.

Hull Photographic Society. "Beverley Minster." F. Webater.

Sheffield Photographic Society. "Venice." H. Merrill.

Keighley and District Photographic Association. Yorkshire Union Exhibition of Selected Prints.

Stalybridge Photographic and Scientific Society. R.P.S. Colour Slides from the Competitions.

Monklands Photographic Society. "Aberdeen City—Ancient and Modern." A. Hay.

Hackney Photographic Society. On the Thames.

Manchester Amateur Photographic Society. Exhibition of the Second Part of Mr. Wormleighton's Slides.

WEDNESDAY, FEBRUARY 20.

Croydon Camera Club. "Floral and Faunal Remains Found in the Coal Measures." Dr. G. H. Rodman.

Hull Photographic Society. "Further Roamings in Europe with a Camera." C. Oxtoby.

Leith Amateur Photographic Association. Exhibition of Members' Work.

THURSDAY, FEBRUARY 21.

Liverpool Amateur Photographic Association. "Three Cities of Andalusia" Rev. T. J. Walahe.

Hull Photographic Society. Members' Slides.

Huddersfield Naturalist and Photographic Society. "By Wood and Moorland up the Hebden Valley." S. Greenwood.

Sunderland Photographic Association. Lecturettes. J. W. Addison and A. E. Cross.

Hammersmith (Hampshire House) Photographic Society. "Some Common Plate Pitfalls and How to Avoid Them." O. Bloch, F.I.C.

Rodley and District Photographic Society. Still Life Competition.

ROYAL PHOTOGRAPHIC SOCIETY.

THE annual general meeting was held on Tuesday evening last, the President, Mr. John H. Gear, in the chair.

In reading the annual report, the only item arousing comment was that of the exhibition. The President set forth the reasons which induced the Council to hold it in the Society's House; notably that early in 1917 there was a strong probability of the manhood service scheme being put into force, in which case it would have been impossible to have carried out the arrangements at the Suffolk Street Gallery; secondly, the entertainment tax would have had to be paid for all members of the society whether they attended the exhition or not; and thirdly, the deplorable state of the gallery, which admitted rain through the skylights. Even the papering of the walls would have cost the society at least £60. He paid a tribute to Messrs. Clifton, Portway, and Vivian Benjamin, who assisted the committee in its work.

Mr. C. Smith said the only fault he had to find with the President's speech was that it was too apologetic. The Council had done the right thing in the right way, and they all appreciated the self-sacrificing labours the President had expended. Mr. Hawkings asked if the society held the gallery on a repairing lease. Mr. Ferguson, K.C., said he was of the opinion that the proprietors of the gallery must either put the place in tenantable repair or terminate the contract. Mr. Warburg, as one who objected to the exhibition being held at the house, asked what the loss would have been at the gallery. The Treasurer said it was impossible to say with certainty, but he estimated the loss at £160. He was thankful that the experiment had not been tried. The Treasurer then dealt with the accounts, which, with the report, were unanimously adopted.

Mr. Lumb moved a vote of thanks to the President, who had been, he said, not a merely ornamental figure-head, although even in that respect he had claims upon the society. He had not only done his duty but more than his duty. Mr. Ferguson seconded the vote, which was carried unanimously, and Mr. Gear responded.

The report of the scrutineers of the ballot was read, showing that voting papers to the number of 181 were sent in, and the following were the officers elected for the present year:—

President, Dr. C. Atkin Swan, M.B., etc.; Vice-Presidents, F. F. Renwick, Dr. G. H Rodman; Honorary Treasurer, A. H. Lisett; Ordinary members of the Council, F. C. Boyes, A. J. Bull, Lieut. D. Cameron-Swan, G. B. Clifton, A. L. Coburn, H. Essenhigh Corke, S. L. Coulthurst, W. B. Ferguson, K.C., T. E. Freshwater, J. D. Johnston, F. Marriage, F. Martin Duncan, C. H. Oakden, F. Sanger Shepherd, W. L. F. Wastell, J. C. Warburg, Capt. Owen Wheeler, S. H. Wratten.

Mr. Gear welcomed to the chair Dr. C. Atkin Swan, who expressed his diffidence in accepting the presidency, and said he could only hope to carry out the duties if he were accorded the whole-hearted support of the Council and members.

The question of holding lectures during air raids was discussed, and it was agreed to abandon those announced for February 19, February 26, March 26, and April 23.

The remaining business was of a purely formal nature, and the meeting terminated at an early hour.

CROYDON CAMERA CLUB.

The annual meeting fixed for the 30th ult. found the attendance poor, possibly partly due to the bombastic night air on the two previous days; the treasurer was also laid up with a cold, so the proceedings were compulsorily held over. The function last week marked the close of a series of weekly lectures and demonstrations, which, for the third year in succession, have been carried through, winter and summer, almost without a break, and faithfully dissimulated in these columns.

Rare indeed is it for a society to possess such an energetic secretary as Mr. J. M. Sellors, a perfect marvel in unearthing talent and securing it for the syllabus. To him most of the success of the past year has been due. Kindly members of other societies have also materially helped, not forgetting the newer members of the club, who have blossomed out in a wonderful way, the informal session being of assistance in affording trial trips. It is hoped this feature will be continued regardless of the merry-making recently indulged in at its expense by a twinkling twinkler responsible for a regular contribution in a contemporary.

Under a rule limiting presidential rank in any one member to two consecutive years, Mr. J. Keane automatically secures the much-coveted order of the boot. In the opinion of all he has partially filled the capacious chair with success and distinction, and tactfully kept his charges in some semblance of order without a touch of the fatal "schoolmaster" in office. Not that a schoolmaster cannot be an irresponsible boy out of school, as one popular member amply demonstrates. Having regard to Mr. Keane's general virtues (*ex officio*) a distinct tendency to moralise and introduce classical tags can be forgiven. Mr. A. F. Catharine succeeds him, and is as different from his predecessor in style as chalk used to be from cheese in taste. The latter member, when on the stump, seeks inspiration from all surrounding space, and it never fails to supply varied atmospheric ideas, and an elegant phraseology, couched in the same dulcet vein whatever the subject, be it Bromoil, or the efficacy of rat poison for its deriders. The president elect when pushed into set vocal effort, optically concentrates more on one spot in the air, or on the table-cloth, which does not afford the same variety, but tends to brevity and observations strictly to the point.

Mr. H. T. Dodsworth, who has put in a lot of hard work as treasurer, was succeeded by Mr. F. C. Reynolds in November last. The accounts show £127 excess assets over liabilities, though more this year has to be written off for depreciation owing to demonstrations by the secretary on repairing the club furniture. The trading for the year also shows a profit. Nobody on the council has had the decency to resign; the librarian has got mislaid, and the "office boy" [illegible] to dust up his friends without hope of thanks or reward. A regrettable resignation is that of Mr. F. J. Terry—photographically [illegible] for the time being. To absent members across the herring pond—"Greetings." Before another annual meeting is chronicled may the spirit behind the Statue of Liberty make itself decisively felt in the great cause it symbolises!

RONTGEN SOCIETY.

At the meeting held on February 5, Dr. Batten read a paper on a simple means of obtaining "Static Currents" from an induction coil. The method consists in connecting one secondary pole of the coil to earth, whilst the other is connected through a series spark gap, oscilloscope tube and a series condenser to the patient, who is placed on an insulated stand. The function of the condenser would appear to be that of a high resistance. The advantages of the apparatus are two-fold. In the first place, it overcomes the troubles due to a wet climate, from which the static machine always suffers; and, secondly, it affords an inexpensive means, to those already possessing an induction coil, of obtaining currents similar to those produced by static machines.

Mr. E. E. Burnside read a paper describing a new mobile snook apparatus. This is constructed on the same principle as the larger pattern hitherto in use, but is made in a more compact form by reducing the maximum spark gap to seven inches.

Mr. Burnside also showed a small transformer constructed for employing the continuous-current main supply to heat the spiral of the Coolidge tube. A small rotary converter changes the direct current into alternating current, which is stepped down to 12 volts by the static transformer. The secondary is well insulated from the rest of the apparatus, and regulation of the filament current is obtained by a variable choke-coil in the primary circuit of the transformer.

News and Notes.

The Photographic Convention.—At a council meeting of the Photographic Convention of the United Kingdom held at Anderton's Hotel, Fleet Street, E.C., on the 7th inst., Mr. Walter Potter and Mr. F. J. Mortimer were elected joint honorary secretaries and treasurers in place of the late Mr. F. A. Bridge, and Sir Cecil Hertslet—who was present at the meeting—as co-trustee with Mr. G. W. Atkins. It was decided to hold a one-day meeting in London, in order to transact the statutory business, in July next. The rendezvous will probably be at the Zoo, because of camera restrictions elsewhere, with an evening social meeting in the city, should time, circumstances, and the Food Controller permit.

A Further Rise in Plate Prices.—It is announced that from February 5 last a further increase on the list prices of dry-plates previously prevailing is being made by the manufacturers. These latest prices are:—Quarter-plates, 2s. 9d.; postcard, 5s.; half-plates, 6s.; whole-plate, 11s. 6d.; 10 by 8, 19s.; 12 by 10, 28s. We understand that they apply to the manufactures of all the firms in the trade one of whom, in notifying ourselves, states as the cause of the further increase the continued rise in the costs of raw material, labour, and general manufacturing expenses. This latest rise averages to about 20 per cent. increase on the prices which have been prevailing since March 1, 1917, when prices underwent the fifth of a series of advances, the first of which was on June 16, 1913. We may here restate in its complete form the diary of plate-price rises which we published a year ago:—

	s.	d.
Before June 16, 1913	1	0
June 16, 1913	1	3
March 13, 1915	1	6
February 29, 1916	1	10
March 1, 1917	2	3
February 5, 1918	2	0

It will be understood that these are the retail list prices for one dozen ¼-plates, and the series marks the successive increases (one of them before the outbreak of war) which have been made within the past four years.

Iodine Reducers.—An abstract in the *Journal of the Society of Chemical Industry* gives the following particulars of a paper contributed by two German experimenters—S. Becher and M. Winterstein—to the *Zeitschrift fur Wissenschaftliche Photographie*, 1917, pp. 1-16:—"Iodine can be used as a photographic reducer in solution in potassium cyanide, in potassium iodide, or in alcohol, and also in combination with thiourea. The solution in cyanide is not satisfactory in use because of the continued action after removal of the image from the reducing bath; treatment with hypo stops the action of the iodine but not that of the cyanide, which is still considerable, as cyanide itself has a definite reducing action. The other methods of using iodine are free from this defect, hypo having an immediate arresting effect on their action; on this account very thorough washing is necessary before treatment with an iodine reducer. Very dilute solutions are recommended:—For plates (a) 1 to 4 c.c.s. of iodine-potassium iodide solution (1:2:200) in 100 c.c.s. of water; (b) 2-8 c.c.s. of the iodine-potassium iodide to 100 c.c.s of 4 per cent. thiourea solution; for papers, solutions about half the strength of those for plates, or a solution of from 4 to 16 c.c.s. of iodine tincture (1:100 c.c.s. of 95 per cent. alcohol) to 100 c.c.s. of 50 per cent. alcohol. The time necessary for reduction varies from 1 minute to about 6 minutes with the first two baths and up to as long as 10 minutes with the alcohol solution. The potassium iodide and alcohol solutions give a yellowing of the image by the formation of silver iodide, but it is quite easy to judge the amount of reduction. A final bath of hypo is necessary to dissolve the iodide and to arrest the action of the reducer, for the latter reason also after the thiourea bath. The strength of the thiourea solution must not be appreciably higher than 4 per cent., as, although the authors were unable to confirm previous statements that thiourea itself has a reducing action, in stronger solution its destructive action on the gelatine film is quite marked. The reducing action of iodine was compared with that of other reducers; it resembles cyanide and Farmer's ferricyanide-hypo reducer in acting evenly over the whole image, in contrast with permanganate, which acts proportionally to the depth of the image, and copper chloride and ammonium persulphate, which act more strongly on the shadows. The solution in potassium iodide, but not the alcohol or thiourea solution, gives the usual blue colour with papers containing starch; it disappears, however, immediately in the subsequent hypo bath.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

⁂ *We do not undertake responsibility for the opinions expressed by our correspondents.*

PASTEL COLOURING.

To the Editors.

Gentlemen,—Even at the risk of being referred to your Advertising Department, we would like to tell your correspondent, "T. A.," that our "Bertha Retouching Powder" was introduced more than ten years ago for the express purpose of meeting a well-known want, *i.e.*, a means of giving to bromide prints a "tooth" that will hold powdered chalk and the like. It can be used on all kinds of gelatine-surfaced papers, and needs no skill in application.—Yours very faithfully,

THE VANGUARD MANUFACTURING CO.,
W. Ethelbert Henry.

Maidenhead.

THE SENSITOMETRY OF PHOTOGRAPHIC PAPERS.

To the Editors.

Gentlemen,—Those readers of the "B.J." who have been interested in the discussion of the above entitled paper must have already reviewed it in the January, 1915, issues of this magazine, and thus formed their own opinion of its merits. Mr. Storr's letter of January 4 last clears up any misunderstanding of his attitude toward the experimental methods and results of Mees, Nutting, and Jones, and indicates that on this important point our views were not divergent. Further discussion is, therefore, unnecessary.

It will be understood, of course, that any seeming asperity in my letter of December 14 was meant only in the Pickwickian sense. (I was going to say Croydonian sense, but that would have precipitated another and more serious controversy.)—Yours truly,

R. L. STINCHFIELD.

736, Hotel Richford, Rochester, N.Y.

ANASTIGMAT v. RECTILINEAR LENSES.

To the Editors.

Gentlemen,—Mr. Nicol's recent article on rectilinear lenses and Mr. Watson's letter on the same subject were very interesting. For plates up to half-plate size, however, an anastigmat seems to me to be the best for all-round work, and will equal the rectilinear in brilliancy if a type with four glass-to-air surfaces is chosen and the front lens is shielded when the wide angle is not required. A rectilinear limits the use of the rising front and enlarging lantern. As regards price, a good rectilinear must cost about the same to manufacture as, say, the Aldis anastigmat.

It is curious that cameras specially built to give a very great rise and long bellows extension should be listed with *f*/4.5 lenses of narrow angle and single focus, some vest-pocket cameras, on the other hand, being fitted with expensive convertibles.—Yours faithfully,

LOUIS NELL.

February 6, 1918.

FIXING POWERS OF HYPO.

To the Editors.

Gentlemen,—In your article about hypo scarcity, of February 8, you mention a maker's recommendations to use 1 lb. of hypo to 150 (one hundred and fifty) p.c.'s. Considering the great scarcity, might this be a misprint, or does it go to prove what many photographers believe—*i.e.*, that makers' instructions are valueless, for it is certainly very extravagant?

Having come into contact with some millions of bromide prints during the last decade, my experience has been that a pound of good hypo will fix close on 600 prints—½-plates and p.c.'s—with care, and in any case should do 400. I have prints by me that have stood the test of time after fixing on this scale, and I have seen thousands toned without any trouble.

It is, of course, necessary to use the hypo reasonably to ensure this economy; one would be lucky to get a hundred permanent prints from a pound if the latter were mixed to paste with alum to make a "fixing" bath, and yet similar things can be seen.

Appreciating the great value of your information with regard to the present hypo shortage.—I am, yours sincerely,

THERMIT.

[We quoted correctly from a maker's circular. Certainly, we think the number small, but our view, as stated in the article, is that any rule for the use of so much hypo per so many prints is very liable to be abused.—EDS. "B.J."]

DEVELOPER POISONING.

To the Editors.

Gentlemen,—Last week you published a letter from Mr. C. M. Foster in which he gives a recipe for developer poisoning (metol, I presume). He states the same to be Ung. Methyl Salicy Co. P.B.C. (British Pharmaceutical Codex). May I respectfully point out he is quite in error, both regarding the ingredients and the quantities in the formula? I have never seen a recipe or prescription being composed of hydrous and anhydrous lanolin (Lanolin Hyd. and Anhyd. 35), there being no use for such in pharmacy. It may be one or the other, but the hydrous is mostly used, being softer to work up in ointments and, I believe, more readily absorbed by the skin.

Further, 35? Does he mean 35 parts of a mixture of the two fats, or 35 parts of each? As written, I should take it to mean the former.

Assuming this to be so, the menthol works out at 26⅓ per cent., against 2½ per cent. in the official formula; but the methyl salicylate quoted is correct.

The formula for B.P.C., Ung. Methyl Salicyl Co. is:—

Methyl Salicyl	12·5
Menthol	2·5
Oil Eucalyptus	2·5
Essential Oil of Camphor	2·5
Hydrous Wool Fat	25
Paraffin Ointment to produce	100

To have an ointment containing 26 per cent. menthol applied to a tender surface, such as that produced by metol is enough to send one crazy for the time being; I should think the pain almost unbearable.

The same remarks apply to the application of citric acid should there be any open places.

Personally, I have never had an attack from the use of metol or these amidophenol developers, but I think, from what I have seen from clients at different times, that the trouble can easily be prevented if precaution is only taken. To wait until the trouble has been caused and then expect an ointment or other remedy to cure in one or two applications is beyond reason. Metol being a phenol or cresyl hard compound, it naturally attacks the skin in a caustic or eating action upon the surface.

To all users of these developers I would suggest, first of all—cleanliness—that is, as soon as developing is finished, to wash the hands well with hot water and soft soap (getting rid of the caustic chemical left on the skin).

Dry well, and then apply a little fatty oil, such as almond or olive, rubbing well into the hand and so keep the surface soft and pliable to prevent cracking. At bedtime rub this ointment well upon the affected parts:—

Zinc oxide	1 Dram
Camphor	½ Dram
Lanoline	5 Drams
Oil Almond	3 Drams

(The zinc is cooling, the camphor for irritation, and the lanoline and oil for softening.)

In conclusion, I would like to warn readers against recipes and supposed prescriptions which are so often published in inquiry columns, especially those in ladies' journals, where advice is so often asked upon complexion and skin matters. The recipe published last week has evidently (in my opinion) been obtained by such course in the first place, and shows plainly that those who tender such formulæ, neither understand the complaint they treat, nor the composition nor use of the drugs they recommend.

James Dunning

(Member Pharmaceutical Society of Great Britain).

PLATE SIZES.

To the Editors.

Gentlemen,—You are right in your remarks about the popular size of plates being too square in shape, but orthodox sizes are, I fear, too firmly established to be ousted from the market. The new Kodak 11 × 7 size may be taken up by anyone requiring a new camera or, of course, one may use it in a 12 × 10 camera by means of a carrier. It is a great pity the 7½ × 5 size—American, too, I believe—went out of fashion. It promised well here in England, but was eventually knocked out by the half-plate.

A popular size in France is the 13 × 18 cm. (roughly, 7 × 5), and during my residence in France I always used it, exposing some thousands of plates of that size. The dimensions are good, but the extra half-inch is, in my opinion, an improvement.

I wonder who it was that set the fashion of our standard sizes. George Knight's catalogue of Daguerreotype cameras, dated 1845, gives the wholes and halves as they are to-day—8½ × 6½ and 6½ × 4¾—but the quarter-plate is given as 4¾ × 3¼. Ross's camera list, published at the end of Cundall's "Photographic Premier," dated 1854, gives the sizes for glass plates (for wet plate work) exactly as they are to-day. The earliest list published by Newton of Fleet Street gives cameras for taking plates 9 × 7 and 6 × 5½, the sizes used to-day not being listed. The list contains details of the Daguerreotype process and no others, and in a "Photogenic" list, also undated, I find 9½ × 6½ and 11½ × 9½ recommended. I have no desire to erect a monument to the worker who established the present-day whole, half, and quarter plate sizes, but as you have always paid particular attention to photographic history, you or your readers may be able to trace their origin. I have most of the handbooks and lists issued during the first thirty years of photography, but the more I study the question of sizes, the more muddled I get.

Anyway, the day of smaller sizes is coming, or has come, and what we want to-day is a really good carrier, not only for dark slides, but for sheaths for use in a hand camera. Comparatively little attention has been paid to carriers, as inquiries at dealers and searches in the files at the Patent Office testify. We have carriers which in many cases serve their purpose, but we could do with something better.—Yours faithfully,

L. Tennant Woods.

To the Editors.

Gentlemen,—I am glad to see that you have a good word for plates in which the length is greater in proportion to the breadth than in the rather squat proportions of the half and whole plate, 12 × 10, etc.

Very early in my photographic experience—some 42 years ago—I changed from half plate to 7½ × 5 for my chief use, and have never regretted it. It is about the smallest size for framing, and the largest (in weight of apparatus) that an average man cares to take about on foot. I have never had any difficulty about getting plates.—Yours truly,

Alfred Watkins.

Hereford, February 11.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply; 6-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

Acid Sulphite.—The acid sulphite solution consists of water 8 ozs., sulphuric acid ½ oz., and a quarter-pound of sodium sulphite crystals added. The bottle is shaken until they are dissolved.

Cleaning Bromides.—How can I best clean up bromide prints, in the absence of methylated spirits?—N. B.

We have found petrol or benzole to answer very well, but if you cannot obtain these, you can use a weak ferricyanide reducer on the wet prints, rubbing gently with cotton wool.

Room Studio.—You must place the sitter where you find the best light. We should prefer to have the background for full lengths in front of the fireplace and towards the window. You should block up the windows about 4 feet from the floor. For heads we should recommend a small background on feet which you can place near the window.

Autochromes on Paper.—The only process which is commercially available in this country for the reproduction of Autochromes is the usual process of half-tone three-colour reproduction. For such work you should apply to a good photo-engraving firm. There are no papers or accessories on sale here for the reproduction of autochromes as paper prints.

Flash Bag.—We do not know of any maker of flash-bags in this country. A method published recently is that of using an umbrella frame as a support, with the bag hanging down about a yard, and then gathered round the stick, which must be lengthened. For big jobs like yours you would have to do as the Americans, who use a number of bags at once and fire the flashes simultaneously by electricity. You can fireproof calico by soaking it in a strong solution of tungstate of soda, or, failing that, a strong solution of common alum.

Studio Roof Curtains.—Will you kindly advise me as to whether the enclosed material will be the best obtainable for studio roof curtains (I am having white ones also)? If not, what shade of casement cloth do you consider will be better? The portrait studio has a large amount of roof light facing east.—E. C. S.

The colour of your sample is all right, but the material seems rather too thin, especially for sunlight. Try and get a thicker quality, or try Bolton sheeting. This in dark blue and black stops all light, and is used for "Zeppelin" curtains in many studios when working by electric light at night.

Emulsion for Dry-Plates.—1. Four hundred grains of silver nitrate will be equivalent to 280 grains of potassium bromide, but an excess of the latter is required to produce complete precipitation of the silver. The same amount of silver will be equivalent to 390 grains potassium iodide, but only a very little of the iodide is wanted in an emulsion. You might try 10 grains. 2. There is no modern work on emulsion making. You can get general ideas from Abney's "Instruction in Photography," and a very good article by A. Cobenzl on emulsions for photographic papers appeared in the "B.J." for September 12, 1913. This number is still obtainable from our publishers, price 4½d., post free.

E. H.—Commercial trade printers invariably "size up" a negative for exposure, or make a test on a square of paper, say, 1½ x 1½ inches. Also a very common practice is to have fixed up in the exposure room a frame of negatives illuminated by diffused light, with the exposure required for each negative under given conditions marked on it. There is a blank space for the negative to be compared with these, and usually the arrangement allows of the negatives being shifted to and fro, so that the newcomer can be fitted in for the better comparison with the standards. A density meter such as those you name is certainly of some use. There is little to choose between the two. We should prefer the latter.

Lenses.—1. Wide angle and R.R. lenses being designed for different purposes can hardly be compared in the way you suggest. Tested under equivalent conditions on a small field, we should not expect to find much difference. 2. The wide angle should have the greater covering power—that is, it should cover the bigger circle, but it might require stopping down below *f*/16. 3. No, because the distance from lens to negative is greater in the enlarger than it is in the camera. 4. If reproducing the 12 by 10 negative full size the 6½ in. lens must be 13 in. from the plate, so that the angle covered is not so very great. It is, however, great enough to suggest that the lens is a pretty good one. If reproducing on a smaller scale, there is nothing exceptional in the performance of the lens. 5. Without trial we cannot say, but we should not expect to find much difference. Possibly the single lens might score as regards definition, but it would be very slow at that aperture.

Acid Fixing Bath.—1. Is the enclosed fixing bath quite safe for prints? 2. Are the fumes from acetic acid harmful, as I was mixing 6 ozs. acetic acid in a stock acid bath with sulphite and alum and I felt rather queer for some time? I had window open at the time. 3. Is it safe to add alum to a hypo bath containing pot.-metabisulphite.—Kadok.

1. Yes, provided the powdered alum is quite pure. This variety of alum frequently contains iron, which reduces the prints and leads to toning troubles. If not sure of your alum, and if you cannot use the special solution, we would recommend the chrome alum formula given in the Almanac. 2. No acid fumes are exactly healthy, and acetic fumes, though less harmful than others, may very likely upset some people, especially in a close dark room. If this is the case with you, it would be wisest to use another formula. It was most probably the sulphurous acid fumes that affected you rather than the acetic, and you would be likely to get far more of these when making up the solutions. The mixed fixing bath may hardly give any. 3. Yes.

Sharp Line Subjects.—I am staff photographer to a firm doing experimental work, and have to take critically sharp photographs of certain line objects, etc.. These have to be (on the plate) about half full size, and the difference between the nearest part and the further part is about equal to the distance from the camera. The enclosed rough print on blue paper will, however, illustrate the problem. You will notice that the camera stands inside a framework, and it is desired to show the details very keen and sharp right along where the crosses are; at these points white labels with index lettering are pasted on, and when photographed some become so indistinct as to be unreadable. A is about 1 ft. 9 in. from camera, and B, 6 ft.; the lens is a Ross anastigmat about 7·5 in. focus, and the smallest stop F/64. It is intended to enlarge from negatives up to about 12 in. by 10 in. It has been suggested to me that a single lens of long focus would be best, if well stopped down, but there is the question of spherical distortion. I have tried a stop of F/256, but the difficulty is to get it in the centre of the lens; but if this is the best solution, I will get a lens with Waterhouse stop, but wish to know before doing so if it will prove effective.—G. E.

The problem, as you explain it, is an unusual and rather difficult one. We fear the only practical method is the use of an extra small stop. The best way to get this in position is to make a cardboard ring that will just fit inside the lens against the iris. Cover the ring with a disc of black paper, and make the stop aperture in the paper. Do not make the aperture smaller than necessary, as with a very minute aperture focus is spoilt by diffraction. The right size should be ascertained by trial. With regard to best lens for use, a good deal depends upon the kind of standpoint you can take up. If you can get far enough away, a lens of the telephoto type, such as the Ross Telecentric, should give the best result. If the print you send us is a sample of the objects you have to deal with, we should consider vibration a very probable cause of loss of sharpness during a long exposure, especially if there is any machinery going anywhere near.

Tribunal Appeals.—Mr. Will R. Rose, 133, High Street, photographic dealer, applied for further exemption for Arthur P. Manners (38), passed B1, married, manager of his Oxford branch. Mr. Manners also applied on domestic grounds. Mr. Andrew Walsh appeared for the applicant, and said that Mr. Manners was the only man in the business, which employed 31 girls and two boys, 12 and 14 years of age. The business supplied the Infirmary and medical men of Oxford with chemicals, and photographic material to University institutions. The real merit of the application was that Mr. Rose, who is 46, joined the R.F.C. at the commencement of the war, and was still in the Army. Temporary exemption for three months.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as "returns" are no longer accepted by the publishers. This step has become necessary owing to the further restrictions imposed by the Government on the importation of paper and paper-making materials and of the consequent shortage of supplies. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

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SUMMARY.

We suggest that the breaking up of old pasture land for the purpose of increasing food supplies is an historic event worthy of photographic record. (P. 85.)

It would seem from recent investigations as to the resistance and durability of lead glass that there is but little foundation for the long-standing prejudice against its use in chemical ware. (P. 85.)

We make some suggestions with regard to the design of the ideal enlarging lantern. (P. 86.)

The War Savings Committee are asking all employers to arrange a simultaneous meeting of workpeople for March 6 for the purpose of inducing employees to invest in War Savings Certificates. (P. 94.)

An automatic stop that allows of the lens stop being completely open during focussing and reduced as necessary during exposure is the subject of a patent. (P. 91.)

A safe method of packing negatives for transmission by post is described by a contributor to "Assistants' Notes." (P. 90.)

The United States Government have now transformed Columbia University into a photographic training school for officers of the American Reserves. (P. 89.)

In a recent communication from the Eastman Research Laboratory, Mr. J. I. Crabtree gives the results of experimental tests on the sludge produced in a pyro developer. He found the deposit to consist almost entirely of calcium sulphite which, undoubtedly, had its origin in the water used for compounding the developer. For small quantities, boiling the water is the simplest preventive; for large quantities the calcium is best removed by precipitation. (P. 87.)

We comment on the conditions that control extreme sharpness in enlargements, and refer to a mysterious patented method, said to have been invented by an American. (P. 86.)

Cuttings of dry mounting tissue in contact with a piece of cotton wool soaked in turpentine have been the cause of fire in a photographer's workroom. (P. 90.)

Particulars of the unsuccessful application of an interned German prisoner of war for his discharge from bankruptcy are given on page 93.

A group of Manchester firms have offered £3,000 to the Manchester School of Technology towards the cost of establishing a department devoted to the study of industrial management. (P. 94.)

The P.P.A. have elected a committee to consider the best course to be taken for the purpose of assisting the proprietors of one-man businesses who have been called up. (P. 82.)

The subjects of developer poisoning, anastigmat v. R.R. lenses, the "Mackie" Line, and plate sizes are dealt with by correspondents on page [illegible]

EX-CATHEDRA.

Worthy of Record. Within a week or two of the present date in all parts of the country events will be taking place which, though they are far removed from the eyes of those in cities, mark a new era in the life of the country, and deserve to be chronicled by the camera. We refer to the ploughing and sowing of land which, in many instances, has not been so treated within living memory. As our readers in purely agricultural districts know, areas to be ploughed for the raising of grain are fixed by local committees, with the alternative of severe penalties if their decisions are not carried out. In many places this break with the past might well engage the attention of the photographer on the spot. The turning of the first bit of turf in fields which have long been used for pasture means much, and might well be made the occasion of a photograph, particularly if some local personage can be persuaded to give it something of the character of a ceremony. Our friends whose interests are in photographic record and survey will not overlook these happenings, but our suggestion here is that the photographer in remote country places should see in these events subjects for a topical display in his window and for the earning of a half-guinea or two from the illustrated newspapers, in which just now anything bearing hopefully on the food problem is assured of a welcome.

* * *

Chemical Glass. At a recent meeting of the Society of Glass Technology a noteworthy paper was read by Messrs. Cauwood, Turner, and Webb on the durability of lead glass, more especially from the point of view of its resistance to chemical action. The special interest of this investigation lies in the fact that while lead glass is a renowned English specialty, there being no finer quality of glass made for table purposes, yet its use in chemical ware has been tabooed on various grounds that now seem to have had very small foundation. The glasses tested were old specimens, one a window glass made in 1845 which had been exposed to the weather for over fifty years, and the other a tumbler made in the early 'fifties. Both were lead potash glasses, the window glass also containing a little boron. The resistance of these two glasses to boiling acids prove better than that of any modern chemical glass, and far superior to that of the much advertised German Jena glass. Both were the equal of modern chemical glass in resistance to the action of water, and were only very slightly inferior in regard to the action of alkalies. The authors' summary is that lead glasses are quite satisfactory from the point of view of both weathering and the attack of reagents. Other people have found Jena glass to be by no means so reliable as it is assumed to be, while it has long been known that the Bohemian glass from which the greater portion of chemical ware was made before the war was distinctly inferior to some other makes, yet these two have been depended upon almost entirely, while the good old-fashioned English lead or "flint" glass has been barred altogether, catalogues proudly guaranteeing to supply glass "free from lead" for chemical use.

* * *

Enlarging—A Secret Method. In our contemporary "Camera Craft" an editorial note refers to the superior results in the way of enlargements produced by the Shipman Photo Process Corporation, of Los Angeles, the note forming an introduction to a somewhat mysterious article by Mr. Joseph Shipman, who gives no details of his methods, or the grounds that they are to be covered by patents not yet granted. So far as we can gather from the article, the special superiority of the results seems to be exceptionally sharp focus with big scales of enlargement, while the forthcoming patents appear to cover some special "attachment that can be put upon any regulation outfit," and which, "when adjusted, makes it a simple and definite matter for the ordinary photographer to make perfect enlargements." It seems to be some purely mechanical device, but whether it is an automatic focussing arrangement, or something of quite a different nature, it is impossible to gather from the article. In our experience, given good apparatus and a good negative, the chief difficulty in getting perfect focus on a big enlargement is due to the distance between easel and lantern. The intervention of a second person is not always satisfactory, for different people differ a good deal in their appreciation of focus, while also it is a little difficult for the man at the lantern to make the precise alteration that the man at the easel deems necessary. There is, however, already in existence an excellent means of getting over this trouble. A low-power opera-glass or telescope can be fixed in a convenient position at the front of the lantern and kept focussed on the screen, so that the man at the focussing screen can get a near view of the image on the screen. This is one kind of attachment that can be used without any fear of infringing Mr. Shipman's patent, seeing that it has been used for many years by lanternists, and has for long been a prominent feature in the optical lantern used at the R.P.S.

* * *

Sharp Enlargements. Whatever. Mr. Shipman's special devices may be, it does not seem to us that he is altogether breaking new ground in producing extra sharp big enlargements. The thing has been done before, not merely occasionally, but many times, and the various introducers of specially small cameras can all show wonderful specimens of enlargements, made from minute negatives, that leave nothing to be desired in the matter of sharpness. In fact, given a good lens, a good illumination system, a perfect negative, and a quite rigid construction allowing of no vibration, the task is not at all a difficult one, and the chief reason why we do not see more dead sharp enlargements is probably the rarity of dead sharp negatives. There is, however, another very important reason, and that is, that only a very few people want excessive sharpness in very big pictures. The model enlargements that we have referred to, as produced for the purpose of advertising small cameras, are painful things to look at. At first sight they are interesting as striking achievements, but they very soon become abominations if we are compelled to have them always in view, and even for theatre display boards and commercial use, which seems to be the aim of Mr. Shipman's enlargements, we think softer and less aggressive results will give more satisfaction even to the general public. We shall be interested to learn what Mr. Shipman's special attachment may be, if he ever permits us to know, but at present we cannot think of anything that is not already available, and cannot quite appreciate the special difficulty that has to be overcome.

* * *

The Enlarger and the Lens A correspondent recently raised the question as to whether the behaviour of a lens in the lantern afforded any criterion of its quality as regards covering power in the camera. An old question this, that has puzzled many beginners. Many seem to think that if a short focus lens will cover a 15 x 12 enlargement, it is showing wonderful covering power, but the size of the enlarged picture has nothing to do with the matter of covering power at all. If we compare the lantern with the camera it is the negative that takes the place of the plate, while the enlargement is simply in the position of the object being photographed. Thus a 15 x 12 enlargement is nothing at all compared with what the lens will "cover" in similar fashion in the camera. If far enough away it will "cover" 15 miles as easily as 15 inches. Covering power, however, relates to the other side of the lens, and concerns only the size of the plate that the lens will cover at its working focal distance, which, with any moderately distant object, is of necessity much shorter in the camera than it is in the enlarger. It can only be the same in the latter when we are enlarging up to full size, or life size, which is a somewhat unusual operation. At one time it was the fashion to advise beginners that the best lens for enlarging was the lens that produced the negative. The advice was not quite correct, but the idea was that if a lens would cover the plate in the camera, it would of necessity cover the same plate in the enlarger. This was a roundabout way of reminding the worker not to use a shorter focus lens, and a direct way of informing him that if he could make a negative he must possess the lens with which he could make an enlargement from that negative. He might, of course, possibly have a still better one, but the advice was defective in that it somewhat obscured this point.

SOME NEEDED REFORMS IN COMMERCIAL ENLARGING LANTERNS.

In this country there has been little progress in the design of enlarging lanterns since the original type of magic lantern was adapted to photographic purposes, Mr. Hume's cantilever pattern being the only outstanding improvement in the course of over half a century. The revolution which has been made in our methods of illumination consequent upon the general use of electricity, and particularly the introduction of the nitrogen-filled lamp, should make the way easy for less bulky and more convenient instruments than those now generally used. On the other side of the Atlantic considerable advances have been made in this direction, and doubtless after the war imported enlargers will be procurable, but it will not be creditable to our makers if they allow a foreign enlarger to oust the home product as they did in the case of studio cameras, in which Dresden, Vienna, and Berlin practically supplied a large market.

In our idea the enlarging lantern should be constructed of metal and asbestos as far as possible. Wood is bulky, liable to warp and burn, and expensive to work. One can make stampings which require little finishing, and an asbestos lining is fireproof, non-conductive of heat, and a protection against short circuiting with electric lighting. The lamp house, as the cinematographer terms it, may conveniently be of cylindrical form, as in one of the American models, the tube being exactly the diameter of the condenser. This is provided with the necessary ventilating apertures and a bed on which the small half-watt lamp can be moved to and fro. The stage to receive the negative should be capable of adjustment so that thick or thin carriers could be used at will. This would allow an arrangement for tilting the negative to be incorporated in the carrier. It would also allow of a small negative being brought further away from the condenser so that it received a greater quantity of light than if it were placed in the usual position. In the case of large lanterns, it is desirable to have smaller condensers interchangeable with the full-sized ones. It is much more convenient to enlarge or reduce from quarter-plate negatives with a 6-inch condenser and appropriate lens than to use an 8-inch diameter for this size.

The arrangement of nearly all the focussing devices is wrong. We have tables of conjugate foci giving distances between lens and paper and lens and negative, and we try to put them into practice by moving the lens instead of the negative. The new enlarger must have an adjustment by which after setting the distance between lens and paper we can move the condenser, negative and light (all together) to obtain a sharp image. With existing patterns with their wooden beds and badly fitting grooves this would be difficult, but with a well-made metal bed it would be quite easy. The best way of effecting this would be to have the whole apparatus on a gantry or base (the lens-board, condenser, and lamp-house being capable of independent motions thereon). The front portion carrying the lens should be fitted with an efficient clamp, so that it would not be disturbed when the negative and condenser were moved to and fro for focussing. It would be an improvement if the negative carrier were detached from the condenser frame, a few folds of bellows intervening; this would allow a small negative to be brought forward so as to receive nearly the whole of the cone of rays from the condenser.

Another point which has been overlooked by nearly all makers is the provision of some means of bringing any part of a large negative opposite the centre of the condenser. This was done some years ago by the London Stereoscopic Company, who issued a book-form carrier in which the negative was held by friction between two frames hinged together. In the quarter-plate size any portion of a whole-plate could be accurately squared-up opposite the centre of the condenser. As it is, makers give a little rise and fall, though much more sideway movement. It would seem that they regard these adjustments as intended to move the projected image in the easel—not their only purpose. In any case the slot in which the negative carrier slides should be open at the top and have sufficient depth at the bottom to allow the centre of a 12 x 10 negative to be placed opposite the centre of a 5½-in. condenser. This is frequently required when a single figure has to be enlarged from the centre of a group.

The length of the bellows is another matter which is not generally considered as closely as it should be. Nowadays enlarging lanterns are very commonly used for reducing as well as for the purpose they are primarily intended for, and it is very necessary that sufficient length of bellows should be provided for this purpose. We have adapted an ordinary cantilever pattern by making an extension cone to fit in place of the lens panel, thus obtaining an extra draw of twelve inches, but this would be much better done by providing a longer bellows in the first place.

To equalise the light and to soften it so that retouching marks and scratches do not show on the print it is very desirable that arrangement should be made to interpose a piece of very fine ground glass between the lamp and the condenser. It serves as well to destroy the image of the filament or incandescent mantle so often evident when the light is in its best position. Quite a small piece placed close to the light is all that is necessary. When ground glass is used in this way the action of the diaphragm in reducing the amount of light transmitted comes into play. The area of the illuminant is increased, the ground glass itself being practically the source of light as far as the optical system is concerned. Hence the cone of rays from the condenser will not pass through a comparatively small aperture, but requires a large one if short exposures are necessary. From actual trial with a small arc lamp it was found that the entire cone of rays emerging from the condenser passed through the condensing lens at an aperture of *f*/16, but when a ground glass was interposed a perceptible diminution of light was apparent at about *f*/10. Trial exposures then showed that with apertures up to *f*/45 the giving of the standard increase of time to each yielded practically equal results, but with additional contrast, as might be expected as with ordinary camera exposures.

THE NATURE OF A DEVELOPER SLUDGE.

(Communication No. 62 from the Research Laboratory of the Eastman Kodak Company.)

The sludge in question was a sample taken from a deep tank containing a pyro developer compounded according to the following formula:—

	Metric.	Avoirdupois.
Pyro	350 grms.	12 ozs.
Sodium sulphite (desiccated)	1,800 „	4 lbs.
Sodium bisulphite	425 „	15 ozs.
Sodium carbonate (desiccated)	560 „	1 lb. 4 ozs.
Potassium iodide	3.25 „	50 grs.
Water to	40.000 ccs.	8¾ gals. (imp.)

On standing a fibrous sludge precipitated in the developer, which settled out in time, but again became disseminated throughout the liquid on the slightest agitation. On examination, the sludge proved to be relatively insoluble in both hot and cold water, and a quantity was therefore thoroughly washed to remove all traces of the developer, dried, and examined as follows:—

(*a*) Under the microscope. Apart from a little foreign matter the sludge was seen to be composed of long transparent prismatic crystals, as shown in fig. 1 (magnified in the reproduction 165 diameters).

(*b*) A qualitative analysis showed the presence of calcium, sulphurous acid, a trace of iron, and some organic matter. On testing for carbonic acid by treating with hydrochloric acid and passing the gas evolved through potassium permanganate and then into baryta water, no trace of carbon dioxide could be detected.

(*c*) A quantitative examination gave the following results:

Loss at 110° C.	.75 per cent.
Organic matter	trace
Iron	trace
Calcium oxide	31.5 per cent.
Sulphur dioxide	35.2 per cent.

From the above it would appear that the sludge in question consisted almost exclusively of calcium sulphite, corresponding to the formula $CaSO_3, 2H_2O$.

In order to explain the presence of the calcium salt, it was at first assumed that some compound of calcium had been accidentally added to the developer, or that some of the ingredients contained calcium as impurity, but as only pure chemicals were employed it was concluded that the calcium must have been originally present in the water used for compounding the developer.

A sample of the water used in preparing the developer was not available. Tap water tested in Rochester, N.Y., contained .02 per cent. solids, equivalent to a mixture of calcium and magnesium sulphates, so that in a chalky district it is quite possible that the content of calcium and magnesium would be far in excess of this, and quite sufficient to cause the formation of an appreciable amount of sludge.

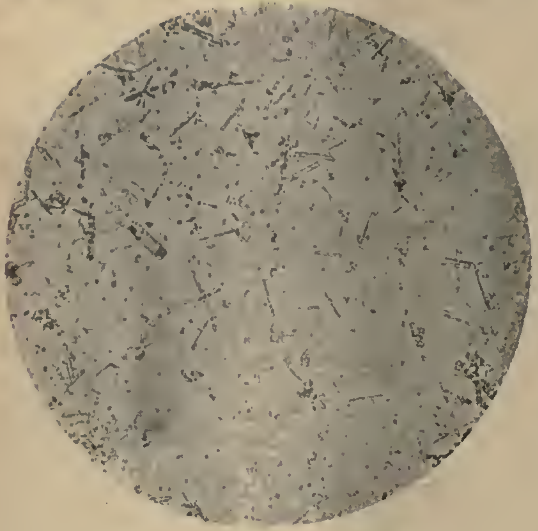


Fig. 1.

The salts usually present in water are bicarbonates, chlorides, and sulphates of calcium, magnesium, sodium, and potassium. Calcium occurs most commonly in solution either as bicarbonate or as sulphate, and according to the following solubility measurements the concentration may be as high as .2 per cent.

Solubility of $CaSO_4$ $2H_2O$ at 18° C. = 2.016 g. per litre (Hulett and Allen, *J. Am. Chem. Soc.* (24), 1902, p. 674).

The solubility of calcium bicarbonate depends on the partial pressure of carbon dioxide in the water, and according to Treadwell and Reuter (*Zeit. Anorg. Chem.*, 1898, 17, p. 170), when the partial pressure of the carbon dioxide is zero, water at 15° C. dissolves .385 gm. per litre of calcium bicarbonate.

In order to determine the precise method of formation of the calcium sulphite the following experiments were carried out:—

1. On adding a solution of sodium sulphite to a weak solution of calcium chloride, or calcium sulphate, a precipitate was formed of calcium sulphite, but not in the presence of an excess of sodium bisulphite, owing to the formation of the soluble calcium bisulphite. With a saturated solution of calcium bicarbonate at 18° C. no precipitate was formed. The further addition of an excess of sodium carbonate gave an immediate precipitate if much calcium was present in solution, but not with a concentration of .25 grams calcium chloride (fused) per litre, and with the concentration of the sulphite, bisulphite, and carbonate the same as that in the developing formula above. On allowing the solution of calcium bisulphite to stand in an open tray for a few hours, prismatic crystals separated out similar to those shown in fig. 1.

According to Weisberg (*J. F. Pr. Chem.* (2), 1871, p. 119), calcium sulphite has a solubility of .043 grams per litre at 18° C., but this dissolves in an excess of sulphurous acid or in the presence of sodium bisulphite forming calcium bisulphite, and on allowing the solution to stand in the air six-sided needles, having the composition $CaSO_3$ $2H_2O$ are deposited.

2. The above experiments were repeated with a magnesium salt (magnesium sulphate), though no precipitate was obtained with sodium sulphite, sodium bisulphite, or sodium carbonate when using solutions of a concentration equal to the concentration of the respective salts in the developer, nor were crystals formed on allowing the bisulphite solution to stand in an open tray. This is as would be expected from the following solubility figures:—

Solubility of $MgSO_3$ $6H_2O$ at 20° C. = 12.5 g. per litre (Hager, *Chem. Cent. Bl.*, 1875, p. 135).

Solubility of $MgCO_3$ in a solution containing 23 grams of sodium carbonate per litre = 0.29 g. per litre (Cameron and Seidell, *J. Phys. Chem.* (7), 1903, p. 588).

The concentration of sodium carbonate in the pyro formula above is such that any magnesium present up to a concentration of .25 grams per litre would not be precipitated as carbonate or as sulphite. Therefore, even though the water used for preparing the developer contained magnesium either as sulphate or bicarbonate, none of this would be precipitated, which explains the absence of magnesium in the sludge examined.

Effect of the Presence of Sodium Carbonate on the Possible Precipitation of Calcium Carbonate.

From a consideration of the solubility measurements of calcium carbonate and calcium sulphite in pure water, the carbonate being less soluble, it would be expected that in a developer containing carbonate some calcium carbonate would precipitate out along with the sulphite, although the sludge examined did not contain carbonate. This may be explained in two ways.

(*a*) If the sulphite and bisulphite solution was allowed to cool in the tank before adding the carbonate, crystals of calcium sulphite would tend to be deposited, which crystals would not redissolve again on adding the sodium carbonate.

(*b*) That calcium sulphite is less soluble than calcium carbonate in a mixture of sodium sulphite and carbonate of a concentration equal to that in the developer. Although no precise measurements were made, on adding an excess of calcium chloride to a solution containing 50 grams sodium sulphite, 10 grams sodium bisulphite, and 15 grams of sodium carbonate, the precipitate obtained consisted largely of calcium sulphite, with only a trace of calcium carbonate. This is explained by the fact that calcium carbonate is soluble in a solution of sodium carbonate forming a double salt, having the formula $CaCO_3$ Na_2CO_3 $2H_2O$ (Barre, *Compt. Rend.*, 154, 1912, p. 279). A rough estimate of the solubility was made by adding a solution of calcium chloride to a 1.5 per cent. solution of sodium carbonate (which is the same concentration as in the developer above), and it was found possible to add .125 grams of calcium chloride to a litre of the solution at 20° C. without precipitation.

Although a number of trials were made, by compounding the complete developer according to the formula above with water containing .25 grams calcium chloride (fused) per litre, in no case were crystals deposited on standing. If water containing calcium in excess of this was used, a white sludge consisting mainly of calcium sulphite was deposited, though this was not of the same fibrous nature as the particular sludge under consideration. It was considered that the needles could only have crystallised within the complete developer, providing the same was mixed very warm, a procedure very undesirable in the case of pyro, owing to its propensity for oxidation.

A Method of Preventing the Formation of the Sludges.

In order to prevent the formation of the sludge, it is necessary to remove the calcium from the water used in compounding the developer. If the calcium is present as bicarbonate, in which case the water is temporarily hard, the hardness may be destroyed by the well-known method of boiling, when the bicarbonate is decomposed and calcium carbonate is precipitated. The "fur" which deposits on the inside of kettles is a familiar example of this. In case small amounts of developer have to be mixed, the simplest way of removing the calcium, therefore, is to boil the water and allow it to cool. In case the sludge under consideration precipitated out from the sulphite and bisulphite solution before adding the carbonate, previous boiling of the water would prevent the precipitation of the sludge, though as this procedure would only remove the calcium from one-twentieth of the volume of the solution, in the event of the sludge crystallising out from the final solution boiling would be ineffective.

When fifty gallons or more of developer are to be mixed, it is not feasible to boil this and allow to cool again. The calcium may, however, be precipitated either as carbonate or oxalate, when present as bicarbonate, chloride, or sulphate, as follows:—

A. Precipitation with sodium carbonate. Add a dilute solution of sodium carbonate to the water contained in a tank, until no further precipitate is obtained, or the carbonate may be added to the water so as to make a definite stock solution, say 2 per cent. The precipitated carbonate will settle out overnight, when the clear supernatant liquid may be decanted. Not all the calcium is removed in this way. (Solubility of $CaCO_3$ at 18° C. = .012 grams per litre), Holleman, *Z. Phys. Chem.* (12), 1893, p. 135, though the amount left in solution is not sufficient to cause the formation of a sludge of calcium sulphite.

B. Precipitation as oxalate. The calcium may be more completely removed by means of sodium, potassium, or ammonium oxalate, owing to the fact that calcium oxalate is more insoluble than calcium carbonate. (Solubility of calcium oxalate = .0059 grams per litre at 18° C.) Kohlrausch and Rose, *Z. Phys. Chem.* (12), 1893, p. 241.

A solution of sodium oxalate is added until no further precipitation occurs, and the solution decanted after allowing to settle. Tests showed that sodium oxalate had no effect on the fogging power of the developer when present even to the extent of 1 per cent, so that a little excess of oxalate during precipitation will do no harm.

Summary.—If the water used for compounding a developer containing sodium bisulphite or potassium metabisulphite contains calcium in solution to the extent of the equivalent of ·025 per cent. dry calcium chloride or more, fine needle-shaped crystals having the formula $CaSO_3$, $2H_2O$ are apt to separate out as a sludge on standing, and especially if the sulphite and bisulphite solution is allowed to stand before adding the carbonate. The sludge is harmless if allowed to settle, as it hardens and forms as a scale, though the developer is robbed of sulphite to the extent of the amount required to form the sludge. If the developer is agitated, the sludge is apt to cause trouble by settling on the emulsion of the plates or films, though it may be removed by filtering.

In case the calcium is present as bicarbonate, thus causing temporary hardness of the water, the formation of the sludge may be prevented by boiling the water and allowing it to cool previous to compounding the developer. If the calcium is present as chloride, or sulphate, in which case the water is permanently hard, this may be removed by precipating with sodium or potassium oxalate or sodium carbonate. The oxalate treatment will also remove temporary hardness.

The author is indebted to Mr. A. P. H. Trivelli for the photomicrograph shown in Fig. 1. J. I. Crabtree.

The Optical Society.—Professor Frederic J. Cheshire, C.B.E., Director of the Department of Technical Optics at the Imperial College of Science and Technology, has been re-elected President of the Optical Society.

COLUMBIA UNIVERSITY AN ARMED CAMP.

Four Thousand Officers of Reserve to enter Government Military School of Photography.

Columbia University took on something of the appearance of an armed camp after the middle of January, for then began to arrive, in squads of one hundred at a time, four thousand officers of the Reserves to learn the most advanced methods of aerial and land photography, and cinema operations.

The United States Government is actively pushing its campaign of education of the masses and its war photographic work, and has accepted the offer of Columbia to make use of its resources for teaching military photography in all its branches. The school, however, is to be managed solely by the Government, which determines also the personnel of both students and instructors.

Only persons who understand the difficulty which has been experienced in projecting photographs which have been filmed by different makes of moving picture cameras can appreciate the object of the Government in assembling four thousand men to study cinematography, as well as "still" photography, at Columbia. The Government has overcome the principal difficulty in perfect cinema operation by standardising everything connected with its cinema work, and wants these officers to become accustomed to the Government equipment, so that pictures taken by different cinematographers may be projected without a flaw on the same screen. That the entire work may run with smooth precision upon the screen, men will learn at the university not only how to take moving pictures, but how to develop, cut up and assemble films, and how to project them in theatre or camp. Not the least important lesson will be how to pack and ship films, so that those taken by a cinematographer in the front line trenches may be safely transported for development in the rear.

The scope of the work is such that the University has had to provide a projection room, laboratory, workrooms, and lecture-halls on the campus, as well as darkrooms, and the customary appliances necessary for the study of still photography. These demands have resulted in a scattering of Government work through different buildings, with the basement of Havemeyer Hall as main instructing room. This spacious floor has a fine north exposure which supplies ideal light for photography, and Monday, January 14, saw the inception of this first Government school of military cinematography in America, and the conversion of the seat of learning into an army post.

The post is limited to the Government's activities, and embraces an administrative force of 125 officers. When detachments of students arrive from their respective camps, they will find themselves under military discipline no less than before, with the gay temptations of Broadway nearer in distance but not in attainment. These men have been drawn from various regiments, because they have some knowledge of photography, and instructors have been engaged to develop this knowledge for military purposes.

Some idea of the Government's appreciation of camera work as a war measure may be gathered from the fact that men will be trained to take still pictures as the airship volplanes to a height proved best for picture-taking. This altitude, of course, subjects both pilot and cinematographer to the risk of being hit by aerial gunfire; and when the pilot volplanes downward to the required level in the air he trusts to good fortune to assist him in making a safe as well as rapid escape.

In their moving picture propaganda the aim of the Government is twofold—to educate the American public in what the nation is doing with our soldiers abroad, and to instil in the minds of soldiers in camps, where the films will be exhibited, an even greater patriotism.

At Columbia the war photography work is in charge of Captain J. Sears, assisted by Lieutenant Carl Gregory and five or six aides, with offices in the Library building. The University has, indeed, without fanfare of bugle or beat of drum, become an armed camp, an established army post, with 125 officers in charge.

A plan is under way to add a School of Navigation, to train officers for our growing merchant marine, with Professor Harold Jacoby, of the Astronomical Department, at the head of it, and it is rumoured that an Aviation School is soon to follow.

Up to the present time passers-by have become accustomed to seeing 200 marines and bluejackets from the School of Engineering drill in the North Court, and some 350 men in khaki drill at night by searchlight on the Athletic Field; but only now has Columbia become an Army post and taken on a military aspect. The military students in the United States School of Cinematography will find their routine of camp life maintained by drills in South Field, and such regulations as prevail in barracks. In this case the barracks are located in the main floor of one of the University buildings, and the student-officers police their own quarters. The posting of sentries has been decided upon by officers of this new Army post, in consultation with the Superintendent of Buildings and Grounds, and the patrol of these has caused Morningside Heights, accustomed to the sight of drills among students, to open their eyes and realise that one of the oldest seats of learning in the country is the most advanced Army post in America.—*Scientific American.*

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Sending Negatives by Post.

When negatives on glass have to be sent by post, as is often the case when the photographer employs outside help or for other reasons, some means of secure packing in order to prevent any possibility of breakage has to be devised. To send glass negatives through the post packed in cardboard plate-boxes is really much the same thing as packing a fragile piece of eggshell china in wood wool, and doubtless many plates are broken during a year, and much extra trouble and annoyance caused by the fact that the long-felt want for a really good strong and simple negative box has not been filled. We used to pack all our negatives in small wooden boxes, nailing the lid down with small pins. This served until one of the plates got cracked, through the jar of the hammer, and this led us to turn our thoughts towards the production of a method of packing that would prevent any such a recurrence. Thinking that our methods may be of interest, and, we venture to hope, of profit to fellow readers of the "B.J.," we describe them herewith. Nothing very startling in the way of originality can be claimed for these methods, but we can assert that we have never had a cracked or broken plate among many sent through the post in this way, and, further, we would point out that if the "cases" are properly made, there is little chance of this happening. The first case we shall describe is for use when two or three negatives only are to be sent. Take two pieces of fret-wood or cigar-box wood about an inch wider and two inches longer than the size of plate in use. Then take another piece of wood of the same size about three-quarters to an inch in thickness, and cut away from its centre an opening only about 1-16th of an inch wider than the plate. This opening must then be extended by removing one of the ends, as Fig. 1. Two pieces of stout felt, such as are used by house furnishers for putting under stair-treads, and which can be bought for a few pence, are next required. These should be cut slightly smaller than the plate, and fixed by "Seccotine" in position to the two flat pieces forming the main parts of the case. This is best done by adjusting them after the cut-out frame (Fig. 1) is in position. They should then be put aside for the adhesive to get thoroughly dry. The case may then be put together by screwing with ⅜-in. brass screws to the cut-out frame. A piece of strong tape sufficient in length to go right round the longest way of the case should be firmly fixed in position inside the top of the latter. The case is now complete. To use it take the plate or plates, which should be wrapped in a piece of clean tissue paper, and push them down into the case, pressing the tape down with them. The purpose of the tape is now apparent. By a gentle pull the plates will be drawn to the top, and may then be withdrawn from the case. The open end of the case is best filled with a piece of wood cut to size to fit the opening. A couple of holes are bored through this, and also in the same position in the top of the case. The top may be tied with string through these holes or a couple of small brass bolts and nuts may be used to keep the plates in position. The negatives will be found to be quite firmly held. A sketch of the case, with the plates partly inserted, is shown in Fig. 2.

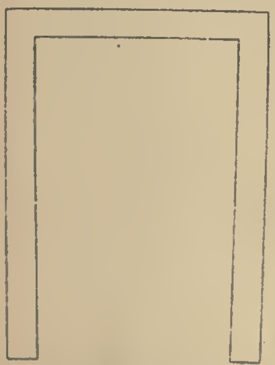


Fig. 1.

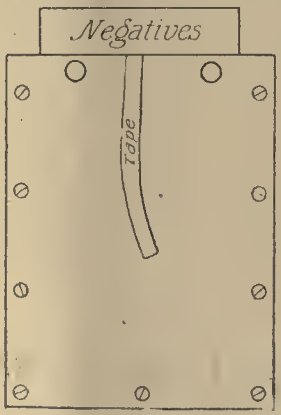


Fig. 2.

A more elaborate case for negatives is one that has also the advantage of being very easily made from an old dark slide of the book-form pattern. The centre-plate, or card, is removed, the shutters glued into position, and the projecting ends cut off flush with the rest of the frame-work. Two pads of felt are then glued over the draw-out shutters, and the job is complete. This will hold two or three negatives without fear of breakage.

When a number of plates have to be sent a very simple and easily formed case is shown in Fig. 3. This consists simply of a felt-lined box just large enough to take the negatives comfortably. They are held in place by the lid, which is simply a piece of wood, also felt-lined, which is held in position by a couple of old springs from a printing frame. It will be thus seen that by the elasticity of the felt and the action of the springs the plates are thus firmly held in position. One point more we may add, and that is the plates should always be packed fairly tightly, for the less they move about the less risk there is of cracking or damage.—Expert.

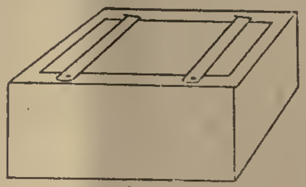


Fig. 3.

FORTHCOMING EXHIBITIONS.

February 16 to March 2.—Edinburgh Photographic Society. Sec., P. T. Mackintosh, 38, Castle Street, Edinburgh.

February 21 to 23.—Leicester and Leicestershire Photographic Society. Sec., H. C. Cross, 80, Harrow Road, Leicester.

March 12 to 15.—Hackney Photographic Society. Sec., Walter Selfe, 24, Pembury Road, Clapton, E.5.

April 18 to May.—Hampshire House, Hammersmith, Photographic Society. Entries close March 19. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12

Tribunal Appeals.—At Portsmouth, Mr. F. G. Allen appeared for the general manager and operator of a firm of photographers, who were doing valuable voluntary work for the Ministry of Food. The appellant was thirty-seven years old, classified C3. He had made a special study of X-rays. He was granted conditional exemption, on condition that he joined the Volunteer Field Ambulance.

A Warning.—A member of the P.P.A. had a fire break out in his workroom on two different occasions, and in neither case could the cause be ascertained. They might have remained as unexplained mysteries had not a third fire been traced to its source. Cuttings of dry-mounting tissue had been thrown into a tub into which was also thrown a pledget of cotton wool soaked with turpentine which had been used for rubbing prints. The result was spontaneous combustion, and it was practically certain that the previous fires had been caused in the same way.—Circular of the Professional Photographers' Association.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the international Convention.

AUTOMATIC STOP IN CAMERAS.—No. 108,458 (August 2, 1916). In ordinary cameras the lens aperture is adjusted according to the light and to the sensitiveness of the plates. In reflex cameras it is frequently necessary to have a large lens aperture. The reason for this is that with a small aperture it is impossible to focus very sharply, as the picture appears to the eye too dull. Even when the object is lighted very brilliantly the picture on the ground glass screen does not appear any more distinct, for the eye is blinded by the strong light outside. It is, however, better to use a smaller aperture when the light conditions are favourable, as this results in a greater sharpness. But the use of a small aperture is difficult, for the reasons stated.

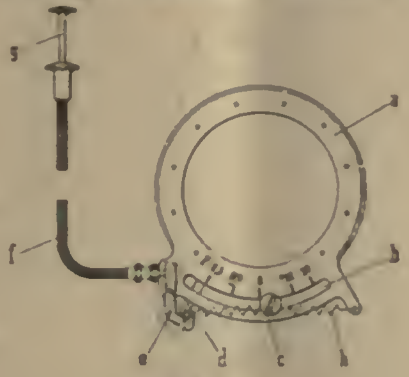


Fig. 1.

This invention aims to remove these disadvantages. This is done by using a stop, which is so arranged that, immediately before the exposure of the plate, the aperture is suitably reduced, when the focal plane shutter is released by the pressure of the finger. The stop is preferably an iris diaphragm with the difference that it is completely opened during focussing, and, as soon as the mirror is drawn back, it closes to a previously determined smaller aperture.

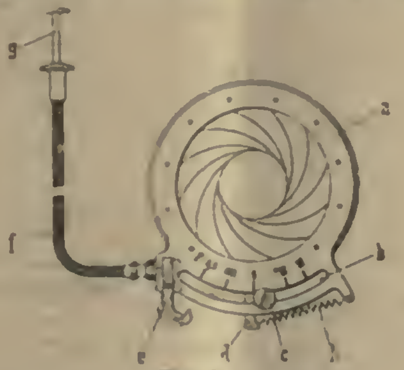


Fig. 2.

Figure 1 shows the stop completely open during focussing, and figure 2 the stop with reduced opening during exposure of the plate. In these figures, *a* is the support of the stop, *b* a slot in which the stop *c* can be moved and locked. As will be seen from the divisions provided on the casing, it has been assumed that the lens has a full aperture *f*/3.5, and that the stop is set so that during the exposure of the plate the aperture is *f*/8.

The position of the iris diaphragm is determined by an arm *d* which is pulled by a spring *h* towards the stop c, but is at first held back by a locking pawl *e*. To the pawl is connected the release lever *f* with the button *g*, so that just before the lever which controls the movements of the mirror and of the exposure slot of the camera completes its movement it forces the pawl *e* back into the dotted position and thus releases the arm *d*. Under the action of the spring *h*, the arm *d* engages with the previously adjusted stop c, as shown in fig. 2.

The chief advantage of the invention consists in the fact that, owing to the use of a very large aperture when focussing, a strongly lighted picture, but not very sharp, is obtained on the ground glass, and focussing can be effected very conveniently and exactly, whilst the photographing is done with an aperture suitable to the light conditions. This avoids over-exposure, and at the same time the lack of sharpness of the objects which are not in the exact plane of the picture is reduced or done away with. The invention could be equally successfully applied to those cameras in which the focussing is done on a ground glass plate. Friedrich Treitschke, 9, Heikendorfer Weg, Neumühlen, near Kiel, Germany.

New Books.

The Rubaiyat of a Photographer. By Annie M. Parr London: Heath, Cranton, Ltd. 1s. 6d. net.

FITZGERALD's rendering of Omar Khayyam has had many parodists, who, with greater or less success, have sought to reproduce the elusive metre of the poem, and, as is the essence of parody, to extract humour, by applying the old Persian writer's maxims and reflections to some modern cult. Many of Miss Parr's forty-eight stanzas embody more of this kind of humour, and at the same time preserve the charm of the original metre more faithfully than other parodies which we can remember. Here is one which needs no explanation:—

> The Lens no Question makes of Eyes and Nose,
> But draws the Cast or Squint in spite of Pose;
> But he who fakes the "Negs." and finished Proofs—
> He knows about it all—He knows, He knows.

Another of a quartet relating the realised effort to get a print hung at one of the annual exhibitions is:—

> And when I sped in Eager Haste to Town
> To see the Pictures by the Salon shown,
> And in my Joyous Errand reached the Spot
> Where Mine made one—they'd hung it upside down.

Many others will equally appeal to those who have made photography a hobby; they will thank the author for having made available a little book than which none could be more welcome as a gift from one photographer to another in place of the stereotyped greetings, such as cards and calendars, which are preserved only until a state of mind is reached in which they can be thrown away.

Finding a Fairy. By Carine Cadby. London: Mills and Boon, Ltd. 2s. 6d. net.

WHEN Mrs. Cadby wrote, and Mr. Cadby illustrated, a story called the "Doll's Day," they endowed children with a fund of joy in following the adventures of the three dolls who for one day came alive and fraternised with rabbits and squirrels in the woods whilst their young mother, in a seventh heaven of delight, looked on. We are quite sure that the finding of a real fairy alive in a wood will be just as fascinating a theme for little people as the romantic performances of the dolls. Like the previous book, the story, in the eyes of the child who reads it or to whom it is read, gains immensely in realism by the exceedingly clever photographs by Mr. Cadby, who shows the little heroine Eve on her travels of discovery in the woods. It is a story-book for children which can be read again and again with endless delight.

Motion Picture Education. By Ernest A. Dench. Cincinnati. The Standard Publishing Company. Two dollars.

LIKE other volumes by this author, the present one consists of a series of short papers, having the appearance of having been separate brief contributions to magazines and here brought together in book form. One cannot help having the feeling that such a subject as that which is suggested by the title of the book needs to be dealt with in a more ordered way. However, there is a mass of fact and suggestion in the author's 350 pages of text, and those who are engaging upon the uphill task of harnessing the cinematograph to real education in this country, in place of allowing it to be spent upon the stupidities of the picture theatres, will find plenty of argument and many good precedents in Mr. Dench's pages.

Rare Technical Books.—We are glad to find that the exigencies of the time in the matter of paper supply have not prevented Messrs. Henry Sotheran and Co. from issuing their customary catalogue of rare and standard books on scientific and technological subjects. The new list which just reaches our table runs to 250 pages, and includes works on all branches of science and technology, and is valuable not merely as a catalogue, but as a bibliographical guide to the date of issue, form, etc., of the many rare books which it includes. Photography is classed in Section IX., under the general heading of "Chemical Technology." It is interesting to note that among the very old text-books of photographic methods Messrs. Sotheran have a copy of the original manual, issued in 1839, on the Daguerreotype process, which is now extremely rare. Another old French book is that by Gaudin, a writer in the 'forties of the last century, and a pioneer before his time in the evolution of a dry-plate process. Still another French work is that of Le Gray, a forerunner of Scott-Archer in the invention of the collodion process. A feature of such lists as Messrs. Sotheran's is the inclusion of reprints of papers read in their day before the learned societies. One of these which is listed is that by Sir John Herschel, "On the Chemical Action of the Rays of the Solar Spectrum on Preparations of Silver," a paper which first announced the use of hypo as a fixing agent, and apparently originated the terms "positive" and "negative," as they are now employed in photography. The catalogue, which is supplied by Messrs. Sotheran from 140, Strand, W.C.2, price 2s. 6d. net, will be welcomed by all with any claim to a wide reading of scientific subjects.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, February 23.

Huddersfield Naturalist and Photographic Society. "The Philosophy of Slang." J. H. Green, M.A.
Stalybridge Photographic and Scientific Society. An Evening with the Microscope.
Edinburgh Photographic Society. Exhibition Lecture, "Rome." T. Shaw.

Monday, February 25.

Dewsbury Photographic Society. Exhibition of Members' Prints.
Bradford Photographic Society. "The Homes and Haunts of Wordsworth." S. Lund.

Tuesday, February 26.

Royal Photographic Society. "Round about Grasmere." F. Humpherson "Nicholas and Napoleon." B. C. Wickison.
Birmingham Photographic Society. "The Book of the Dead." Isaac Bradley, J.C.
Hanley Photographic Society, Y.M.C.A. Architectural Slides. S. A. Cutlack.
Keighley and District Photographic Association. Yorkshire Union Exhibition of Selected Lantern Slides.
Hackney Photographic Society. Experiences and Opinions of Members.
Manchester Amateur Photographic Society. Photographic Parliament.

Wednesday, February 27.

Croydon Camera Club. "Travellers' Samples." F. Ackroyd.
Bristol Photographic Club. "Some Hidden Beauties of Nature." F. H. Stevens.
Ilford Photographic Society. "Exchange End of the Telephone." A. F. Hills.

Thursday, February 28.

Liverpool Amateur Photographic Association. "Eastern Wirral, from Birkenhead Priory to Stanlaw Abbey." T. J. Smith.
Hull Photographic Society. Y.P.U. Portfolio: Egyptian Slides.
Stockport Photographic Society. Lecturettes by members.
Hammersmith (Hampshire House) Photographic Society. "One Man Show." F. Brangwyn, R.A.
Rodley and District Photographic Society. Members' Night.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held on Friday, February 8. Present: Messrs. G. Hana, A. Basil, Gordon Chase, A. Corbett, C. F. Dickinson, A. Ellis, S. H. Fry, R. Haines, N. N. Speaight, Lang Sims, F. G. Wakefield, H. A. St. George, A. H. L. Chapman (Swansea), P. Lankester (Tunbridge Wells), T. C. Turner (Hull), and Alex. Mackie.

In reference to the National Portrait Gallery, it was announced that a question would be asked in the House of Commons at an early date.

In reference to a complaint that had been received from a non-member who had sent the *Evening News* 7s. 6d. for a colourgraph enlargement, as advertised, and although the money had been sent in October last the enlargement had not been received, a number of letters sent to the complainant by the *Evening News* was read. The Council agreed upon a certain course, and the hon. secretary was instructed thereon.

A complaint having been received from a photographer that a competitor in business was displaying as specimens of his own work copies of photographs printed in a certain publication, the hon. secretary reported the action he had taken.

The hon. treasurer reported that the accounts for the past year had been duly audited, and would be issued to members, with the notice convening the annual general meeting.

It was decided to invest another £100 in War Loan, making £600 in all.

The matter of a new arrangement for fire and other insurances was discussed.

The Lang Sims Scheme.—Mr. Lang Sims reported that he had attended a meeting of the Business Man's Association, an organisation founded for the purpose of assisting proprietors of one-man businesses who had had to close their businesses on account of joining H.M. Forces, to reinstate themselves in business after the war. The chairman of the meeting referred to the fact that since the scheme had been started various trades have formed organisations to effect this purpose, to apply to members of the respective trades, and suggested that instead of working independently, these separate organisations should become affiliated to the association. A committee was formed, upon which Mr. Lang Sims was appointed, to consider the course to be taken.

Among the new cases were two as to the relations of the applicants with their respective landlords; one as to the liability of the applicant under the Shops Act; one as to the obligation to pay wages to assistants absent through illness. The progress of various cases in the solicitors' hands was also reported.

CROYDON CAMERA CLUB.

Mr. B. T. Rose, last week, was down for a chat on how he constructed and fitted up his darkroom at home, and all who know his predilection for system in everything, anticipated rightly that the darkroom would be a well-ordered affair.

Like that of the professional, the amateur's darkroom varies largely in space and convenience, the modest cupboard under the hall staircase being on the lowest rung. Frequent accidental encounters between the head and the stairs render this improvisation suitable only for those of professed morality, otherwise visitors ascending to the floor above may be considerably astonished at the sentiments wafted from below. Still, such a cupboard far exceeds in size the mid-Victorian portable darkroom on wheels, or tent, in which collodion plates were coated and developed by photographers on tour. The upper part of the human anatomy entered it; the lower did not. Celerity in manipulation was desirable, for asphyxiation threatened from within, and without there was the danger of a triple combination, represented by a small boy, a stout pin, and an uncontrollable sporting impulse. After all "boys will be boys," the dear little cherubs, and the conditions ensured them quite a respectable start in the subsequent sprint. And then the mystery attaching to the smell of the ether, giving an alchemistic touch to the operator, who, in those days, had to be a craftsman in the true sense of the word. Now, thanks to the plate and paper makers, exposure-meters, or what not, even the average member of a photographic society can turn out decent photographs almost automatically. To those who become swollen with pride in the process—and some are so afflicted—a course of wet collodion is confidently recommended as a remedy for technical flatulence, though, unhappily of no avail for that peculiar mental distension due to excesses in pictorialism, which in grave cases may be followed by artistic *delirium tremens*. A very sad example recently illustrated this.

But we are leaving Mr. Rose to bloom unheard. As a matter of fact, though he blossomed in every direction, the flowers were hardly suitable for gathering to form a report, a state of things not altogether new. A wunderful model of his darkroom, complete in every detail, was greeted with much laughter and applause, and the many contrivances explained aroused so much interest that supplementary lectures started in various parts of the room, occasionally drowning the main theme. Another time the newly elected cigarette-smoking president (Mr. Catharine) must exercise more authority. His predecessor invariably indulged in cigars, an example which might be followed as tending to inspire reverence for the chair. True, the adjacent secretary used to complain bitterly of nasal martyrdom, but this was doubtless due to the prejudice of a pipe-smoker. Besides, it takes years to become acclimatised to the smell of some cigars.

Out of the many tips given we select one. Carriers for the enlarging lantern were shown constructed out of strawboard, a material, Mr. Rose said, which never warped and lasted well. The novelty consisted in the turn-buttons, which consisted of ordinary pins driven through the strawboard, and then bent at right angles by pincers operating in the aperture of the carrier, the ends of the pins being finally snipped off. A very neat and useful idea, as the usual turn-button cannot be attached to strawboard with screws. In the discussion which preceded a most hearty vote of thanks for a capital demonstration, Mr. Keane strongly recommended linoleum for covering the enlarging board, on the ground that it was "inexhaustible as regards pinholes." Any attempt to reason out a concrete idea based on the strict wording of this statement had better not be attempted.

Commercial & Legal Intelligence.

A GERMAN BANKRUPT'S APPLICATION. At the London Bankruptcy Court on Tuesday last an adjourned application was made for the discharge of August Ernst Gottlieb Thospann, the Prisoners' of War Camp, Towcester, Northants, lately carrying on business at 9, Fore Street Avenue, E.C., photographic dealer. Mr J. B Knight attended as official receiver, and the debtor was brought up under a military escort.

The official receiver reported that the receiving order was made on June 8, 1916, on a creditor's petition. The liabilities expected to rank against the estate for dividends were returned at £2,359, and no assets were disclosed by the bankrupt and nothing had been realised. The bankrupt was a German subject at present in an internment camp. In 1900 he left Germany for Paris, where he was employed as a traveller until 1906, when he came to this country with a capital of about £100. In 1908 he entered into an agreement to act as agent on commission in England for Messrs. Oeser, of Berlin, a firm of photographic dealers, with an office at 9, Fore Street Avenue, E.C. He then owed about £500 to German bankers and others, which was still owing. He also held other agencies for German houses dealing in cameras, photographic goods, and gelatine. He now owed Messrs. Arndt and Lowengard, of Wandsbek, £535; Messrs. Curt and Bertzen, of Goerlitz, £90; Messrs. Nogel and Weinhold, of Hirschberg, £100, in respect of money and goods received on their behalf, and for which he had not accounted to them. The debtor's ledger, which contained the greater part of these accounts, had been lost. The bankrupt states that he drew from his business for salary and personal expenses the sum of £400 a year, which far exceeded his profits. When war broke out he found that nobody would trade with him, and on September 14, 1914, he transferred his assets to a company registered as A. Thospann and Co., Ltd., with a nominal capital of £1,000 in £1 shares. He was appointed managing director and secretary of the company at £104 per annum and £1 per week for expenses. The assets he assigned to the company consisted of the goodwill of his business, valued at £200, and the stock in trade, furniture, etc., which he valued at £800. He was to receive 998 fully paid shares in the company and discharge all the business debts and liabilities. Debtor alleges that his object in transferring his assets to the company was to try to start some other business, and that he hoped to make terms with his Belgian and German creditors after the war. The debtor at the time was being pressed by his creditors and was hopelessly insolvent, and, after the transfer of his assets to the company, was entirely without means to meet his liabilities. The bankrupt was unable to give any adequate reason as to why he was likely to be more successful in trading as a company than in trading as a private firm. In December, 1914, bankrupt met the petitioning creditor, to whom he agreed to pay £3 per week in consideration of his receiving an interest in an invention for a new periscope, but the invention proved to be valueless, however; he was sued by the inventor for arrears for salary, and, judgment having been obtained against him, the bankruptcy proceedings ensued. Bankrupt alleged his failure to have been caused through the stoppage of his business owing to the war, to loss on Stock Exchange speculations, and loss on exploiting the periscope invention. One of the chief causes of the bankrupt's insolvency, however, was the transfer of his business assets, valued at £1,000, to the limited company under the circumstances stated. Amongst the creditors of the bankrupt were six firms in Germany, whose debts amounted to £873 in respect of goods and money received, and which bankrupt had appropriated to his own use and benefit.

The official receiver had been prevented from communicating with the creditors in Germany, and consequently was unable to say whether the bankrupt had been guilty of fraud as an agent. Under these circumstances the official receiver submitted that consideration of the bankrupt's application for discharge should be adjourned until after the conclusion of the war. At the outbreak of war, the bankrupt, as already stated, transferred all his assets to the company, leaving himself entirely without means to pay his creditors, but whom he alleged the company would pay. The bankrupt was hopelessly insolvent at the time he transferred those assets, and did not consult any of his creditors before making such transfer. After the company was formed the bankrupt drew out of the company's fund £840, of which he sent £111 to his wife in Switzerland, and the remainder he spent either on himself or on enterprises in which he was interested. Subsequently the bankrupt sold the whole of his shares of the company to his lady typist and expended the money. In November, 1915, the bankrupt gave a bill of sale over his household furniture in consideration of an advance which he used for living expenses; consequently the debtor denuded himself of the whole of his assets.

Under the foregoing circumstances the official receiver submitted that the debtor had been guilty of misconduct in relation to his affairs, inasmuch as when he was insolvent and unable to pay his debts as they became due, and without the knowledge and consent of his creditors, and without obtaining an independent valuation, he transferred the whole of his assets to the company. That the bankrupt had also been guilty of misconduct in having entered into with one Zeigler, by means of a fictitious loan, a certain hire-purchase agreement in order to defeat Zeigler's creditors. Debtor purported to lend Zeigler £125, and in consideration of this Zeigler purported to sell to the debtor his furniture, but the debtor admitted it was a bogus transaction. The official receiver further submitted that the bankrupt's assets were not of a value of 10s. on the amount of his unsecured creditors. The debtor admitted having traded with a knowledge of his insolvency, and he further charged the debtor with having contributed to his bankruptcy by rash and hazardous speculation.

The learned Registrar, in giving his decision, said it was a difficult and anxious case to deal with, because, owing to the war, the relations between debtor and certain firms in Germany, to whom he owed money, could not be properly investigated. It looked as if the debtor had been guilty of such misconduct as to amount to fraud. Under those circumstances, even if there were nothing else in the official receiver's report, he should feel some doubt as to whether he ought now to deal with this application. He proposed to adjourn the application, mainly on the ground of misconduct, and he should adjourn the application for two years from the present time, in the hope that the war would then be over, and it might be then possible to communicate with the foreign creditors. When the case came on in two years' time, and he decided to suspend the debtor's discharge, it would date from the day upon which he made his original application, but he would give debtor liberty to apply at an earlier date if at any time he could satisfy the Court in regard to those transactions.

News and Notes.

Trade Marks.—The Trade Marks Committee of the Federation of British Industries has decided to oppose Part 2 of the proposed new Government Bill "To Amend the Trades Marks Act, 1905," on the ground that it will inflict serious injury on the owners of perfectly legitimate trade marks. Part 2 deals with provisions for the prevention of abuses of trade marks. It has also been decided by the same committee that the proposed British Empire Trade Mark should be opposed.

Fleet Street Photographer as Official War Photographer.—Second Lieut. A. Console, a well-known London Press photographer, has just been appointed one of the official photographers by the War Office. Mr. Console commenced his photographic career with Messrs. Kodak, Ltd., as a demonstrator and instructor. Leaving them for Fleet Street, he soon after received an appointment on the staff of the "Daily Mirror"; for many years he acted as their special correspondent in many parts of Europe, including the Tripoli campaign. In 1912 he made a balloon flight over the Alps from Interlaken to Upper Bavaria, covering a distance of 300 miles and reaching the altitude of 17,500 feet; he also descended inside the crater of Vesuvius, the second time on record that a descent has been safely attempted. He holds a certificate from the Swiss Alpine Club, granted for making a record descent of Mont Blanc, the previous holder being a German. During the present war he was attached to the Italian General Headquarters as a special correspondent. In 1916 he left the "Daily Mail" to join the A.S.C. Mechanical Transport, and shortly afterwards was appointed instructor and lecturer to the A.S.C.M.T.

A Business War Bonds Week.—A strenuous effort of business men to promote the sale of National War Bonds and War Savings Certificates is to be made during the first week in March. Employers of labour are asked to adopt an instalment plan (if they have not already done so) for the purchase of War Savings Certificates which has been found to be so eminently successful. The Hon. Organiser, Mr. Warcham Smith, asks every employer to arrange a meeting of his workpeople on Wednesday, March 6, at 12 noon (11.45 where luncheon hour is fixed at noon). The urgency of the matter in relation to victory should be explained to the workpeople, and typewritten slips prepared beforehand should be handed round showing :—1. The instalments which the employer is willing to accept. 2. Space for the amount of War Savings Certificates desired by the employee. 3. Space for signature of employee. If, therefore, the employees' investment in War Savings Certificates, added to the employer's own in National War Bonds, are registered on Thursday, March 7, the enemy will learn the cause of the strange silence of our industries between 12 and 12.30 on the previous day. Those able to co-operate in this scheme are asked to advise Mr. Wareham Smith, National War Savings Committee, Salisbury Square, E.C.4, so that he may forward their acquiescence to the National War Savings Committee.

New Lectureship in Industrial Management.—A group of large firms engaged in the principal industries of the Manchester district have offered to the Governing Body of the School of Technology the sum of £3,000, spread over a period of five years, towards the cost of establishing a new department of industrial management. The Manchester Education Committee have recommended that this gift be accepted, and expressed their high appreciation of the donors' public spirit. It is proposed that a lecturer shall be appointed for this period of five years, at a salary of £600, to conduct research in the subject of industrial management, to organise a new department, to lecture to members of the University and to the public, and to assist industrial concerns in the solution of management problems. To make doubly sure that the department shall keep in close touch with practice, a number of managers, directors, scientific experts and others, who have had special experience or are responsible for important innovations, will be invited to deliver public lectures, being offered substantial fees, which will not only pay them for placing their knowledge at the disposal of their fellow-managers, but serve to encourage enterprise and experiment in matters connected with management. These lectures should be of assistance not only to future managers, but to those already in that position; they will strengthen the idea that management is a science, and that every manager is, or should be, something of a scientific researcher.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

DEVELOPER POISONING.

To the Editors.

Gentlemen,—Your correspondent, Mr. Jas. Dunning, seems to imagine that I am out for every poor bromide printer's blood. On the contrary, I merely stated my experience in the hope of helping anyone who is afflicted with the scourge of our profession.

I do not indulge in "ladies' journals," my complexion being good in parts like the pre-war curate's egg, but I have a supersensitive and absorbent skin, which requires drastic remedies to cure.

It is a feeble argument to state that the application of menthol or citric acid to a wound causes "unbearable pain." Certainly there is a "nip" on applying, but I contend that that is just what is wanted, as it cauterises the wound, just as a doctor would heal certain septic wounds by cauterisation. It is a case of being cruel to yourself to be kind.

I may state that Mr. Dunning's surmise as to the source of my information is entirely erroneous, my informant being like himself a "Member of the Pharmaceutical Society of Great Britain."

Mr. Dunning merely repeats my advice (to apply to hands before starting to work) when he states that the trouble can easily be prevented if precaution is only taken. And his suggestions about cleanliness, hot water, dry well, etc., are reiterations from previous letters in the "B.J.," and only a fool or a child need have them pointed out. Moreover, his camphor recipe is somewhat reminiscent.

The formula I sent may not be the one in the British Pharmacopœia for rheumatic pain, but it healed my hands after years of suffering, and that is the salient fact which other sufferers would do well to note and, I trust, benefit by.—Yours faithfully,

Alloa. C. M. Foster.

ANASTIGMAT v. RECTILINEAR LENSES.

To the Editors.

Gentlemen,—The articles you have published and the correspondence on the circles of illumination of lenses will have served a good purpose at the present time if they lead photographers to realise the qualities of some lenses which now lie stored away in cupboards. If one were buying a lens for all purposes, the choice would naturally be a good anastigmat, which has capacities beyond the rapid rectilinear both in working aperture and covering power. But a big price must be paid both in money and in convenience of working for the lens with the superior corrections, and now that rapid rectilinears are a drug in the market a battery of them can be obtained for the price of the anastigmat, and each lens of the battery—used within its capacity—will probably equal the anastigmat in performance, if not always in rapidity.

A 6-in. anastigmat with an angle of 90° gives a circle of illumination of thirteen inches. Used on a quarter-plate it contributes one-fourth of the light it passes to the making of the picture and three-fourths to the fogging of the plate. It is true that the unwanted three-fourths of the light can be cut off by a hood. That is another way of saying that the very qualities for which a larger price has been paid have to be sacrificed to the obtaining of a clear picture, and that by methods which are bothersome in actual working. I should prefer to use a lens of ordinary angle for the generality of work and a wide-angle lens for extreme subjects, and the two could be procured to-day for very much less than the anastigmat.

Are not photographers making a fetish of this correction of astigmatism? That is the whole point. Astigmatism should not show in a good rectilinear until a comparatively wide angle is required, and corrections in a lens which only show outside the angle of the picture taken, while scientifically interesting, are of no practical value.—I am, yours truly,

Alfred H. Watson.

26, Morpeth Mansions, Westminster, Feb. 18, 1918.

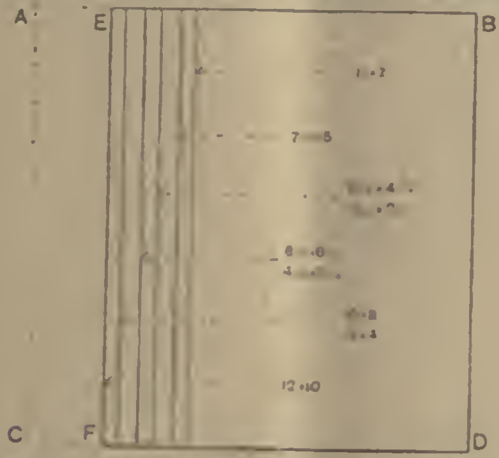
PLATE SIZES.

To the Editors.

Gentlemen,—Your remarks, as well as those by a correspondent, are interesting. The new American 11 by 7 size would certainly be of service in single-figure portraiture, as there is undoubtedly a lot of waste when the standard and old-established sizes are used.

Standard sizes are more square than many workers imagine, but we have become so accustomed to them that we do not perhaps notice the squareness. I have often heard the 5 by 4 size condemned as being too square in shape, but we still go on using the 12 by 10, which is even more square than the smaller size, a fact that may be proved by mathematics or diagrams. Put in another way, the 12 by 10 has the proportions of a plate measuring 5 by 4 1-6—if my methods of calculation be correct.

The accompanying sketch shows approximately the squareness of the orthodox sizes. A B C D in a true square. A 12 by 10 takes up the area of the square as shown E B F D, and using B D as the side for all the sizes and reducing them to a given height the other edges (sides) come to about the positions marked, thus one may see at a glance how the squareness diminishes and how narrow the 11 by 7 and 7½ by 5 sizes are compared with the whole, half and quarter plates.—Yours faithfully,



G. Wilson

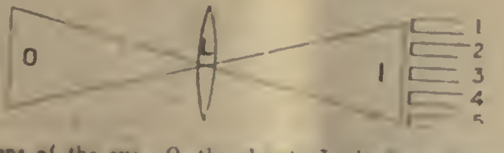
THE MACKIE LINE.

To the Editors.

Gentlemen,—Reading in the "B.J." of February 8 "Some New Facts and Experiments on the 'Mackie' Line," by Mr. A. Lockett recalled to my mind some experiments similar to Mr. Lockett's I did four or five years ago. I was then engaged upon watching the effects of retinal fatigue and after images upon the eye, and during some of the experiments I noticed that, when a dark object was placed upon a light background, there was always a lighter line between the two. This led me to try and find out why such should be the case; and, thinking the theory found might be of some interest to your readers, I am sending it along.

It is to be remembered, first of all, that an image of the object looked at is formed upon the rods and cones of the retina—i.e., portion of the eye sensitive to light, which rods and cones secrete what is known as "visual purple." This is used up when an object is looked at intently for some seconds, resulting in an "after image" being formed, and which can be distinctly seen if the eyes be closed. The first theory, then, was that the image partly overlapped some of the rods outside those used by the image, and used up the visual purple secreted.

I append a diagram to make my meaning clear.



L, the lens of the eye. O, the object; I, the image formed upon the rods. 1, 2, 3, 4, 5, 1 and 5 being rods of which only half are being used to receive the image, resulting in the whole of the "visual purple" therein being used up.

However, I abandoned this theory, as I found that, upon withdrawing the object so as to produce a smaller image, which would at one place or other form an image upon whole rods only, the lighter line was seen all the time.

The second one is, I think, nearer the mark—*i.e.*, the eyeball is never still, but oscillating all the time, resulting in the image being partly on one set of rods and then on another set, this going on backwards and forwards all the time the "visual purple" is being used up, and the after image produced is projected, and surrounds the object.

Contrast certainly plays an important part. To any of your readers who intend trying these experiments I would recommend their also trying with coloured objects, when the complementary colour of the object will be seen.—I am, yours faithfully,

Frederic G. Tritton.

18, Archibald Road, Barnfield Road, Exeter,
February 11, 1918.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

S. B.—Try W. Butcher and Sons, Ltd., Camera House, Farringdon Avenue, London, E.C.

S. Barns.—The hypo seems to be of full strength, and not to contain anything injurious. We do not think that you need worry about the colour.

Resident Pupil.—There are no schools of photography in London where arrangements are made for residents. About the best school is that of the Regent Street Polytechnic, the management of which has a special bureau for the purpose of finding suitable accommodation for ladies who come up to town for the course of instruction.

Retouching.—The idea is to employ the Brasso as a local reducer, using a small bit of wash leather or cotton wool to rub down denser parts. If it leaves any greasiness, a rub with petrol, benzole, or turpentine will leave the surface clean enough to take the medium. As the polish smooths the surface of the film you will not find the medium take quite so easily as on the natural surface.

C. A. W.—(1) The lenses of this make which we have tried have been of excellent quality. (2) They were made by a German firm, Schultze and Billerbeck. (3) Anastigmats are very scarce just now. Anything up to three-quarter list price. (4) You must form your own conclusions. Get the lens on trial. (5) The firm is now known as Staley, Shew and Co., 88, Newman Street, Oxford Street. (6) Yes, if f/11 is rapid enough.

Storing Plates.—Is there any advantage in storing plates in a cupboard, or will they keep equally well in a room? Is a cold, dry room better than warm?—M. B.

It does not matter where you store plates so long as they are kept from light, sulphur fumes, and damp. A cool room, if dry, is better than a warm one. Keep them out of the fumes from sulphide of soda if you use it for toning bromides.

Yellow Spots on Bromide Prints.—We should say these are splash marks, and that the ferrotype plates have been splashed with some bleaching chemical solution; from the colour we should suspect ferricyanide, or perhaps a bleacher of ferricyanide and bromide. If no solutions of this kind are about it may be that the French chalk is contaminated in some way. If washing the ferrotype plates does not stop the trouble, we should try new chalk and new plates.

Lighting in Portraiture.—Your trouble is due to the white distemper. Cover this with something dark and you will find a great improvement. You may use a small movable reflector as needed, and a circular head-screen to further control the light. You can get a good deal of variety in the lighting by turning the sitter away from the light and working the camera somewhat out of the centre line of studio. Always remember that it is only the light that is a fixture. Neither the sitter nor the camera is screwed to the floor.

D. G.—We do not understand what you mean when you say you are trading in your own name. Your stationery shows that you are trading as the "X" Studios. In these circumstances you require to register, and to comply with the rules of the Registration of Business Names Act in the way of legibly marking all your stationery with your real name. Where you seem to have gone astray in your mind is by thinking that you can trade under a fancy name so long as you put your real name on your stationery. But that, by the Act, you are prohibited from doing unless you register.

Tone in Bromides.—Why should prints on "B.B." paper, toned in ammonium sulphide, vary in colour, some being a blue-brown tone, others yellow? This is after the prints have been through two hypo baths for ten minutes, and washed sixteen changes from dish to dish.—B. L.

The difference in colour after toning is usually due to variation in the time of development. If you expose for as short a time as will give a good print and develop for two minutes, you will get a deep brown. If you over-print and develop for fifteen or twenty seconds, you will get yellow tones.

Acid Fixing Bath.—Can you help me in the following?—I use tank developing and fixing. The formula for fixing is:—Hypo, 70 lbs.; sulphite soda, 5 lbs.; glacial acetic acid, 4 pints; grd. alum, 5 lbs.; water, 35 gallons. Dissolved in order given. Films and plates are fixed for half an hour, and bath is strengthened periodically. As you know, the price of chemicals is now very high. Can you recommend an alternative bath that would answer the purpose, or could we use some other acid in place of the acetic, which is now an expensive item and difficult to obtain?—W. R.

You might substitute half a pint of pure sulphuric acid for the acetic acid, and also leave out the alum, which is hardly necessary for plates, especially at this time of the year. Dissolve the sulphite and hypo separately, and then add the acid to the sulphite solution before mixing.

Lighting the Studio.—I want to follow "Practicus's" hints about lighting studio, which he gives in an article a few weeks ago, and as my new studio is 15 ft. x 8 ft., I think the standard electric for lighting will suit all right. Where can I buy the standard with fittings for 3,000 c.p. half-watt lamp, and also what kind of reflector is needed for shadow side of studio, and where to get same, if you think I should best have three of 1,000 half-watt lamps instead scattered, as per Practicus's plans? Please oblige by enlightening.—L. A. S.

You can procure all fittings for half-watt lamps themselves from the General Electric Company, Ltd., 67, Queen Victoria Street, London, E.C. Ask for booklet of Atmos type. For a small studio the single standard light is convenient, but is rather more difficult to manage than a number of lamps of the same aggregate power. In any case, you will find a small circular head-screen a great assistance in controlling the lighting. Any ordinary studio reflector may be used. If you have not one, a light wooden frame, about 6 ft. high and 3½ ft. wide, covered with white paper, with a strut back, will answer very well.

Half-Watt for Enlarger.—Is the ½-watt electric incandescent lamp a suitable light for bromide enlarging? If so, is it made in any form which could be conveniently used in a ½-pl. Cantilever pattern enlarging lantern? The ordinary bulb is far too large. Failing this, is there any other form of electric light—other than an arc—on the market which would answer as well for this purpose? What candle-power do you advise?—A. K. D.

There is a special form of lamp for this purpose, the filament of which is a wire spiral fixed in a circle about an inch in diameter. The bulb is about three inches in diameter, candle-power 200. As the lamp is recommended to be used with the filament in a horizontal position, it would be advisable to fit it with a 45° mirror below, so that the circular aspect of the filament is presented to the condenser. Write to the General Electric Co., 67, Queen Victoria Street, London, E.C., stating your requirements and the voltage of your supply, for particulars. The only other suitable lamp would be the Nernst, but the filaments are rather frail, and expensive to replace.

Enlarging.—1. You can easily find the correct position for negative, lens, and plate for enlarging to any desired size by employing the ordinary rule for finding the conjugate foci, which is that the greater conjugate (lens to paper) is the focal length of the lens multiplied by the number of times the image is to be enlarged, plus one. The lesser conjugate (lens to negative) is once the focal length of the lens, plus the focal length divided by the magnification. Thus, to enlarge 1 in. to 15 in. with a 4-in. lens requires 4 by 16, or 64 in. lens to paper, and 4 by 4/15 in., or 4 4-15 in. lens to negative. If the bellows of your enlarger will not close up sufficiently to enable you to use your 4½ lens, you must have a sunk front fitted. The same would, of course, apply to the 6-in. lens, or, as an alternative, you could use the 7-in. Homocentric, and allow 112 in. from lens to paper, and 7 7-15 lens to negative. Measure from the diaphragm with either of these lenses. 2. None of the stains you mention will affect the image; if you want a deep tint, an old pyro solution will give you a good colour. We assume that the oak stain is a dye; if it contains any pigment it will not be suitable. 3. It is impossible to answer this positively. As a rule, a negative taken with a soft focus lens will yield rather too fuzzy an enlargement, but all depends on the degree of unsharpness of the negative. If you are using a flat field lens on the enlarger you can soften the definition to any desired extent by judicious focussing, even with the sharpest negative.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as "returns" are no longer accepted by the publishers. This step has become necessary owing to the further restrictions imposed by the Government on the importation of paper and paper-making materials and of the consequent shortage of supplies. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

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SUMMARY.

The first portion of an important paper on the axial aberrations of lenses issued by the Bureau of Standards of the United States Department of Commerce commences on page 101.

Collectors of old photographic books, whether for the sake of the books themselves or with an idea of making a profitable sale of them at some time or another, will find a good deal of valuable information in an article by "Bibliophile" on page 100.

An article dealing with a hitherto unsuspected cause of [illegible] during the process of precipitating old fixing baths is given on page 98.

Some hints on the preservation of plates and paper will be found on page 97.

It occasionally happens that a small object of considerable depth has to be photographed on a fairly large scale, and the calculation of the stop required to give fine focus presents a difficulty. We simplify the problem on page 99.

The annual report of the Professional Photographers' Association for the past year is reprinted on page 102.

To those undertaking mirror portraiture some advice on focussing, lens aperture and lighting of the sitter will be found on page 97.

Hints on [illegible] a useful [illegible], and a [illegible] for holding [illegible] paper [illegible] are the subjects of "Assistants' Notes" (p. 103).

[illegible] the invention of Mr. [illegible] of [illegible] by a process of distillation is given on page 98.

Coating postcards, [illegible] blind [illegible] and the [illegible] of [illegible] are dealt with in "Answers to Correspondents" (p. 107).

A substitute for the [illegible] used in wet plate developers is recommended by Mr. O. P[illegible] on page 106.

Two interesting letters on the [illegible] of exhausted fixing baths will be found on page 106.

The [illegible] in the [illegible] which appeared in the "Colour Photography" Supplement are given in [illegible] on page 104.

"Colour Photography" Supplement.

The use of a [illegible] compound reflector, in order to prevent loss of light as far as possible in both camera and projector, is the subject of a patent granted to the [illegible] Colour [illegible] of America (p. 9).

The current instalment of the "Everyday Practice" of colour photography deals with the making of light-filters for use in the exposure of Autochrome plates by flashlight and other forms of illumination (p. 10).

EX-CATHEDRA.

Mirror Portraits. We were recently inspecting a number of portraits by different workers, among which were several which showed the reflection of the sitter in a mirror as well as the direct image. In some instances the results were quite pleasing, but in others the poor show made by the reflection quite spoiled the effect of the composition. Mention of a few points on which mistakes were made may save others who essay this style of work from committing the same errors. One is connected with focussing and the lens aperture. It must not be forgotten that the reflected image is not on the plane of the silvered surface of the mirror, but as far behind it as the real object is in front of it, therefore the focus must be "divided" so as to secure as even a degree of definition throughout as may be desired, a much smaller aperture being necessary than when the figure alone is taken. For the same reason the sitter must not be too far from the mirror. If that is so, not only will the aperture have to be reduced till a long exposure is necessary, but the reflection will appear too small. This is especially the case if the lens is of rather short focal length. Another difficulty is to be found in the lighting. Very often the lighting which is most suitable for the figure is not so for the reflection, or vice versa. where a full face and profile are to be shown it is usually advisable to let the profile appear in the mirror. Care must be taken not to allow a strong reflected light from the mirror to spoil the lighting of the face. Finally, the pose must be such that both images appear graceful and well balanced, both individually and in combination. The mirror worker must place himself in the position of the sculptor, whose work to be successful must bear inspection from any point of view. Generally speaking the mirror should be kept vertical, except when heads are taken, when a slight inclination may be advantageous.

* * *

The Care of Stock. An avenue for leakage, which in some cases may be of serious dimension, but which is very usually appreciable, is to be found in the careless way in which most photographers keep their stocks of mounts, chemicals and other materials. This might be permanently remedied at a small cost, and at the present time the prevailing prices of all requisites call for this economy, which needs only a small outlay to put in operation. Mounts are from a hundred to two hundred per cent. above pre-war prices, yet how many are left in broken packages to get smoky and dusty before they are next required! Every size of mount should have its own well closed stock-box, so that when a package is opened the contents can be at once transferred to it; the cloth-covered boxes used by drapers and stationers answer well for mounts, and the boxmakers will readily make any special sizes to fit existing shelves or pigeon-holes. Sensitive plates and papers are also best preserved in special boxes, a good and safe form of which is like the old-fashioned pull-off cigar-case, one section sliding into the other from the end. The plates may be left in their own box for purposes of identification; the store-box being large enough to allow for this. The method of preserving is especially useful for large sizes, which are not in everyday use, and frequently are found in a doubtful condition owing to the damaged state of the packing. Great care should be taken to store all sensitive plates and paper well away from where there is any risk of sulphide fumes reaching them. Vapour of this description rapidly causes black edges on bromide paper, and metallic markings on plates. If possible the sulphide-bath should always be used where there is a good draught to carry away the obnoxious fumes. With regard to chemicals, it is perhaps only necessary to say that these, even if purchased in paper wrappings, should be transferred to boxes or bottles as soon as received, while those of a volatile nature should be kept in stoppered bottles.

* * *

Why "Enlargements"? A recent number of a Transatlantic contemporary gives a very useful tip to photographers who wish to sell pictures of a larger size than the usual cabinet. It is simply to use enlargements without announcing them as such. The prospective sitter is shown prints in various sizes and the order booked in the usual way. If the order is for the cabinet or a smaller size an enlarged proof is submitted when the finished prints are delivered; this is usually purchased, and not infrequently further large copies from the same or other poses. The freedom of modern plates from blemishes and the excellence of the lenses used makes it easy to produce enlargements up to two diameters which require no "working up" in the ordinary sense of the word, and which bear no evidence of being other than contact prints. For a good class of business a print—black or sepia—may be made on cream crayon paper with a narrow masked margin, this is mounted on a rough drawing paper, which, by the way, is now easier to obtain than most tinted mounting papers. The masking is easily done while enlarging, and if the mask is fixed upon a glass plate hinged to a card back there is no necessity to make pinholes when fixing up the paper.

* * *

New Method of Silvering Mirrors. In the "Journal" of the Optical Society of America, a new and very valuable publication from the point of view of those interested in optical matters, Mr. Otto Stuhlmann, jun., describes a new method of making mirrors, applicable in the case of any metal, and to any material, varying from glass to paper. It is described as a distillation method, and the principles are simple, though the apparatus needed is a little complex. Briefly, the process is as follows: To produce a silver mirror on, say, glass, a horizontal silver wire is heated to incandescence by means of an electric current, and the glass to be silvered is placed about one inch below it. The whole apparatus being in a vacuum, the wire is drawn at a uniform speed backwards and forwards across the glass, which is covered with a uniform coating by the descending metallic vapour. With small objects, such as galvanometer mirrors, a row can be arranged under the wire and treated simultaneously, the operation being completed in about one minute after the necessary vacuum has been obtained. It is claimed that either opaque or semi-transparent mirrors can be produced with equal ease, the thickness of the coating being determined very simply by the time given. Seeing the great difficulty there is in getting really good mirrors by chemical processes, it would seem worth while to give this new method a trial.

* * *

The Pseudo Mackie Line. Mr. Lockett, in a recent article, referred to the fact that an effect similar to the so-called Mackie line is frequently noticed on photographs, as the result of an optical illusion. This, however, is not a new observation, for when two different densities come into sharp juxtaposition they always seem to be falsified in some way at their mutual boundary. The phenomenon is akin to the effect always observed in plate-testing strips—that is, in strips that have been exposed in steps in a testing machine. Though we know as a matter of fact that each step is absolutely uniform in density, yet, to the eye, each appears to be of graduated density, being distinctly lighter near the next darker strip, and darker near the next lighter one. The effect is, in some cases, so marked that it is difficult to realise that it is only an illusion. The cause is somewhat obscure, and need not worry us, but the kindred effect described by Mr. Lockett cannot well be mistaken for the true Mackie line, as the latter has usually a sharply defined outline, and is not graduated. Moreover, it is nearly always accompanied by the familiar "streamer" effects, which are most definitely not optical illusions at all.

THE RECOVERY OF SILVER RESIDUES.

Many photographers who have attempted to recover the silver from used fixing baths by the old expedient of adding liver of sulphur to precipitate the metal as sulphide, have been disappointed at the apparently small yield, and a little recent experience of our own seems to suggest that in many cases only a portion of the silver is recovered if the usual methods are adopted. Having some hypo solutions especially rich in silver, in fact, almost saturated with it, as the result of some experimental work, recovery seemed worth while, and the usual course was adopted of adding liver of sulphur and occasionally testing with a few drops of liver solution to see if precipitation was complete. Apparently it was complete, the test having no appreciable effect, but a few days after, when preparing to deal with the result, we retested, this time with a solution of pure sodium sulphide. The result of this was an immediate and very heavy precipitate of fresh black sulphide, which showed that the process of recovery was by no means ended. The final result was a big increase in the quantity of sulphide, but if we had proceeded to collect the sludge at the time when the liver test seemed to show that the silver was all down, a very big proportion of the metal would have been thrown away. This experience is not altogether new, for years ago, when experimenting on the collection of residues, we found some little difficulty in determining when the action was complete. The pure soda sulphide was, however, not then the common commercial chemical that it is now. Sulphide toning had not been thought of, so no demand existed for the pure product. We were, therefore, not able to confirm our suspicions in the same way, nor to introduce a better process. It was often stated that an excess of liver of sulphur would redissolve some of the sulphide, but no one seems to have arrived at what would seem the logical conclusion, that in that case precipitation would very likely never be complete, while the exact moment of complete precipitation, if such existed, would be rather difficult to hit.

The truth seems to be that silver sulphide is by no means such an insoluble compound as it is generally assumed to be, while in some of its modifications it is pretty readily soluble. It can exist in a colloidal state, in which it may be said to be soluble in plain water. To some extent it seems to be soluble in hypo, or in some of the products into which hypo can decompose. What we call liver of sulphur is an extremely complex and impure mixture of various sulphides, or poly-sulphides, which, for all we know, may produce a similar variety of sulphides of silver, some of which may be much more soluble than others. As a rule, silver sulphide when in solution is brown in colour, but this cannot well be detected in the muddy mixture of a hypo bath with liver of sulphur. A used fixing bath quite free from developer will turn brown as the result of silver sulphide going into solution, and it will be a long time before the black sulphide appears at all. If we boil a clean hypo solution in which silver bromide has been dissolved we can get the same effect more quickly, while if we boil fresh silver sulphide in hypo we may get it again by a reverse action. Precisely what goes on in the dirty mixture of used hypo and liver of sulphur it is impossible to say, but it seems certain that there is every chance of a goodly proportion of the silver failing to come down to swell the bulk of the sludge and the amount of the refiner's cheque.

Apparently, by the use of the pure soda sulphide crystals the uncertainty can be removed, and there does not seem to be any particular reason why the pure salt should not be used. The pre-war retail prices of pure soda sulphide and commercial potassium sulphide (the "liver") were about the same; possibly after the war the soda salt may be the cheaper, for the price of potassium compounds is always likely to remain fairly high. The sodium salt is a true monosulphide, and it is quite clear that the simpler the compound used the more certain are the results. At the time of writing it happens to be dearer than the "liver," but this state of affairs can only be temporary.

It so happens that the commercial varieties of potassium and sodium sulphide are both called "liver of sulphur," sometimes the one and sometimes the other being supplied under that name. We have tried both, and apparently there is little to choose between them from the point of view of recovering residues. Both seemed singularly inefficient and unsatisfactory as compared with the pure soda compound.

A SPECIAL PROBLEM IN DEPTH

With regard to depth there continually arise questions, some few of which concern somewhat unusual conditions, requiring a knowledge of points not always understood. Numerous published formulæ and tables enable one to estimate the depth given by a given lens with a certain stop, but, occasionally, the reverse problem crops up, and we have to find out what stop is required to produce a given depth. The same tables may serve for this query, but if the conditions require an abnormally small stop, or a lens of out of the way focal length, they may not afford any useful information at all. Sometimes it is essential to make photographs under quite abnormal conditions that in the ordinary way we should avoid most carefully, and then it becomes necessary to be able to calculate out results, not shown in any tables, and most probably to use formulæ that are not often published.

We will take the following assumed case. Suppose a small object of considerable depth is to be photographed direct on a fairly large scale. It is obvious that we then have to deal with a very near subject of great depth and the difficulties involved are peculiar. Rare as such cases may be, they nevertheless have to be dealt with at times, and so it is as well to be prepared for them. It is somewhat troublesome to set up the camera and make trial direct, because the stop required will generally be much smaller than any provided. A temporary stop will have to be made, and it is much quicker to calculate out the approximate size required than to attempt to arrive at it by trial and error. To avoid having to use a stop smaller than is necessary the first thing to be done is to ascertain the right distance on which to focus. Three distances are involved: that from the lens to the nearest part of the object, that from the lens to the most distant part, and then the distance of the plane upon which we should focus sharply. The third distance is, of course, an intermediate one, but the plane on which we should focus is by no means halfway between the nearest and farthest parts of the object, though it is often assumed to be. It is really only a relatively short distance beyond the nearest part of the object. It is quite easily found, for, in mathematical language, the middle distance is the harmonic mean between the other two, which means that it is equal to twice their product divided by their sum. Suppose, for example, the near point is 3 ft. from the lens and the far point 5 ft. Then the distance on which we should focus is the harmonic mean between 3 and 5, which equals $\frac{2 \times 3 \times 5}{3 + 5} = 3\frac{3}{4}$, so that we should focus on a distance of 3 ft. 9 ins., or only 9 ins. beyond the nearest point. This extra distance must be noted, as it comes in when calculating the stop to be used.

Now we want the aperture, which can be expressed either in the form of the *f*/number or by the diameter. The following are the data that we require:—

f = The focal length, which we may assume to be 8 ins.

b = The distance of the plane in sharp focus beyond the nearest point of the object. This we have already found to be 9 ins.

u = The distance from lens to nearest part of object, which we have taken at 3 ft. or 36 ins.

d = The distance from the plane in sharp focus, not to the lens, but to the front principal focus of the lens, that is to a point one focal length in advance of it. We have already found the distance from the lens to be 3 ft. 9 ins., therefore the distance now wanted is 3 ft. 9 ins. less 8 ins., which equals 3 ft. 1 in. or 37 ins.

Finally, we must decide on the amount of confusion to be allowed in the image. It is very usual to take this as 1-100 in., but in practice this is too much, certainly in a case like the present, where good focus is desired. It is therefore best to allow only 1-200 or 1-250 in. We will take the former.

Having these data the *f*/number is equal to

$$200 f^2 \frac{b}{u d}$$

which in our assumed case equals

$$\frac{200 \times 64 \times 9}{36 \times 37} \text{ i.e., } f/86.5$$

If we prefer to get the diameter of the stop, which is generally more convenient, we use the following formula:—

$$\frac{u d}{200 f b} = \frac{36 \times 37}{200 \times 8 \times 9} = .0925 \text{ ins.}$$

what we may call one-eleventh of an inch.

Such a stop will have to be made, as it is certain the lens will not be provided with it, but very good temporary stops can be easily made in opaque black paper. Card is too thick; the best way to proceed is to cut a ring in card that will fit the lens, then paste black paper over it and in that cut out the stop aperture. Such a stop can be fitted without much difficulty to any lens.

Registration of Business Names.—Samuel George Osbond, of Bank Chambers, High Holborn, was fined £20 at Bow Street Police Court last week for failing to furnish the particulars required under the Registration of Business Names Act, 1916.

OLD PHOTOGRAPHIC BOOKS OF NOTE.

Photography, as an art or craft, has experienced various fortunes in different countries in the matter of its literature, using this latter word to denote not only the photographic text-books, but also periodical publications dealing with photography. In this country, with one or two notable exceptions, the books and treatises on photography have been essentially of a "scrappy" and superficial kind—more so as years have gone by and photography, from being the craft of the skilled, has become the pastime of the million. Broadly, it is true that the photographic public in this country at any time within the past fifty years has been averse from spending more than five shillings or so on a text-book of photography as a whole or on one branch of it; and within more recent years if it was desired to issue a photographic text-book in such an edition that its publication realised a fair profit to the publisher, a shilling, or half-a-crown at the outside, may be said to have been the price which it was necessary to put upon it. It is clear, then, that in these circumstances the text-books in this country could be no better than very summary treatments of the subject as a whole, or even of parts of it. On the other hand, no country has been better served in the way of its periodical publications. With the sole exception, perhaps, of the "Bulletin" of the French Photographic Society, there are no photographic journals which can point to a past record of publishing the most valuable and important contributions to the advancement of photography as can "The Photographic Journal," the organ of the Royal Photographic Society, "The Photographic News" (up to some fifteen years ago), and, we hope we may be allowed to say it, "The British Journal of Photography." The United States, which is little better than ourselves in the matter of text-books, has been always far below us in the character and importance of its photographic periodicals. And as regards the two other Continental countries, Germany and Austria, to which the remainder of the photographic literature chiefly belongs, it may be said that while "Photographische Korrespondenz" has had its good series of years, no other German or Austrian photographic journal is able to take a place beside the three British periodicals which we have just named. On the other hand, those who have written in the German language have for years past been second to none in the thoroughness and comprehensiveness with which they have embodied photographic knowledge in a series of most comprehensive text-books. It is scarcely necessary to refer readers of German to the volumes of Dr. Eder's "Handbuch der Photographie," and the almost equally compendious volumes of Pizzighelli. In France a similar encyclopædic work, that of Fabre, stands to the credit of our friends across the Channel and encourages the hope that the writing and publishing of such a series of volumes are not tasks only within the competence of a Teuton, but may one day be accomplished in a way worthy of its subject by the Anglo-Saxon community.

So much by way of introducing what is the main purpose of these notes, namely, to signalise the few volumes, some old and some comparatively recent, which may appropriately come within the scope of the collector of photographic books. When I say collector, I use the term in a wide sense, namely, to mean the man who buys such books for his own pleasure as well as he who gives a shilling or two for the volume on the second-hand bookstall with a view to making a profitable sale of it later on. As regards those of the latter category, it is necessary to remember that the market for old photographic books is a small and peculiar one. It does not compare in the least with that for, say, first editions of Dickens or Thackeray, for the reason that private collectors of the past literature of our craft are practically non-existent. Sales of such books are made not to persons or institutions who value them for their rarity, but, in the main, to concerns which require them for incorporation in a technical and utilitarian library Thus the Patent Office Library is a regular buyer of books on photography, which forms an important section of its collection in Southampton Buildings, and is duly catalogued in the "Subject List of Works on Photo-Mechanical Printing and Photography" published in 1914, price 6d. But perhaps the greater number of sales are made to the institutions in the United States, such as the Smithsonian Institution, the Franklin Institute, and technical laboratories such as those o the Eastman Kodak Company and the General Electric Company. It needs hardly to be pointed out that European works on photography are much rarer in America than they are here and thus for this reason alone the old European book commands a better price with an American institution than with one here.

As regards the books to which these remarks apply, one seldom met with is Hunt's "Researches on Light," the firs edition of which appeared in 1844, and the second edition in 1854. A fair value of either edition now is from £1 to £1 10s. The volume, it should be noted, is not very properly named, inasmuch as its subject is not light itself, but the chemical action of light; the volume embodies the many experiments and minor researches carried out in these early days by Robert Hunt, and contains a mass of observations, many of which have now been forgotten. It is to be distinguished from the "Manual of Photography," by the same author which ran through a series of editions from about 1851 to 1857, and is a book which can frequently be met with in second-hand shops. Its value is small, about a shilling or two.

Of a greater order of rarity is a small volume of 58 pages in paper covers by Louis Ducos du Hauron, viz., "Les Couleurs en Photographie: Solution du Probleme" (Paris 1869). In this book, and in a second edition issued in 1878 Du Hauron who was an inventor far in advance of his time outlines not only the various methods of making colour prints on paper by the subtractive processes, but further sets out with considerable precision the various alternative systems of screen-plate photography, which, thirty years later, were first realised by his countrymen, MM. Lumière. A reasonable price for either of these books is from £1 to £2.

In colour photography, again, a volume which is rare but is of importance in the development of processes of colour photography, is "A New Principle in Heliochromy," by F. E. Ives published in Philadelphia in 1889.

The Daguerreotype process is the subject of the first text-book ever written in connection with photography, namely that by Daguerre himself, entitled "Historique et Description du Procédé du Daguerreotype" (Paris, 1839). The translation, by J. S. Memes, appeared the same year in London under the title "History and Practice of Photogenic Drawings and the Principles of the Daguerreotype." Both books are very rare, as is also another, apparently also a translation from the original French, "A Practical Description of the Daguerreotype," a translation by J. P. Simon. This also was published in 1839.

The original "Historique" has a value of about £5. A re-edition, also of 1839, with supplementary notes by Levelou and Susse Frères, is priced now at about £3; and the English translations have about the same value.

Coming now to more recent works, a volume which can still be picked up at booksellers in Charing Cross Road for a shilling or so is one of the best written and comprehensive text-books ever published in photography, although dealing for the most part with processes which have now become obsolete. This is "A Practical Guide to Photographic and Photo-Mechanical Printing," by W. K. Burton, published by Messrs. Marion in 1887.

In the field of sensitometry and measurement of plate speeds a rare little book which is now often asked for is No. 56 of the "Photo-Miniature" entitled "The Hurter and Driffield System," written by the late V. C. Driffield, and published by Messrs. Tennant and Ward in 1903, originally at 6d. This little monograph on a subject which has since come so much to the front is now fairly priced at, say, 5s.

On the historical side a comparatively recent volume which has now gone out of print and, the author being dead, is not likely to be reissued, is "Tom Wedgwood, The First Photographer," by R. B. Litchfield. This is the only book which contains a correct and critical account of the early experiments of Wedgwood in photography at the latter end of the 18th century, and a description of other work for which priority has been claimed in relation to Wedgwood's.

Another very valuable book to the photographic historian which is now difficult to get is the catalogue of the Exhibition at the Crystal Palace held by the Royal Photographic Society in 1898. This catalogue contains a lengthy review of photographic lenses from the very earliest period to the date of the Exhibition, together with notes on the photographic technique at the time of the Exhibition. Probably no other volume supplies the same accurate review of the state of photography at this time.

BIBLIOPHILE.

AXIAL ABERRATIONS OF LENSES.

[We are indebted to the Bureau of Standards of the United States Department of Commerce for the following paper, which deals with the chief axial aberrations of lenses and describes in detail the practical method worked out by the Bureau, based upon that of Hartmann for the measurement and plotting of the aberrations. In reproducing the text of the paper, exigencies of space have compelled the omission of one section, namely, that dealing mathematically with the sources of error. A brief abstract of this section is inserted in the text as printed, in its appropriate place.—EDS. "B.J."]

The definition in the centre of the field of a lens system is generally assumed to be good, but its relative importance in different lens systems varies greatly. In a telescope objective, where only the centre of the field is used, the errors there require strict correction, while those which affect only the edge of the field can be neglected. In a projection lens the same is true, but to a lesser degree, since more of the field is used than in a telescope objective. Here the central corrections are important, though often neglected because of the low cost of the lens and because the observer sitting at some distance from the projected picture does not see small imperfections in the image.

In photographic lenses a large field is very desirable—really a requirement—and more attention must be paid to the definition at the edge of the field than in the previously mentioned cases. Here a compromise must often be made between the centre and the edge of the field. In these systems the colour must be well corrected to avoid chemical focus or the blurring of the image, due to the actinic rays focussing nearer to (or farther from) the lens than the visual. Especially is the colour correction important in lenses used for colour photography and in process lenses.

In astrographic lenses, those used in stellar photography, a field is required which is large relative to telescopic systems, but small compared with lenses for ordinary photography. Over this field they are required to be corrected very accurately with regard to all aberrations, though colour is of secondary importance, since a colour screen, or plates which are sensitive only to a short range of the spectrum, may be used.

In portrait lenses the central definition is of greater importance than that of any other part of the field, since focussing on the eyes of the sitter will give sharp definition there and produce the effect of concentrating the attention on the expression without directing it to less important details.

In all cases the central definition is very important, and the determination of the errors in the centre of the field will generally give a comparative value of the lens. The central corrections show, with very few exceptions, the highest quality of definition a lens will give. Even in a lens with a large field, when a compromise must be made between the centre and edge of the field, the central definition must be at least as good as the edge, if not better.

Purpose of Investigation.

The following investigation was undertaken to determine the errors of a complex lens system which affect the definition of the image near the centre of the field, and to compare the various types of lenses on the market with respect to their corrections for central definition and their applicability to various purposes for which they might be used. The lenses investigated were in the following principal classes:—Photographic lenses of relatively large aperture; projection lenses for stereopticon and motion picture work; telescope lenses of short focal length and large aperture and telescopic systems.

Errors Affecting an Optical Image.

It seems advisable to define and describe the errors found in optical systems before proceeding to discuss the method used in determining them. Each one of these errors is called an aberration, there being seven principal aberrations, namely:—(1) Axial chromatic, (2) oblique chromatic, (3) spherical aberration, (4) zonal variation of equivalent focal length (sine condition), (5) curvature of field, (6) astigmatism, and (7) distortion.

1. AXIAL CHROMATIC ABERRATION.—When a ray of white light (Fig. 1) passes through the lens *LL* at *Q*, a prism action is exerted on the ray, and the white light is broken up into its component elements. The red component, or the ray of longer wave length, is brought to a focus at a point P_1, farther from the rear lens surface than the violet component or the ray of shorter wave length, which is focussed at P_2. The intervening wave lengths are focussed between the points P_1 and P_2. This error is known as axial chromatic aberration. The amount of chromatic aberration, or the distance $P_1 P_2$, is dependent upon the focal length of the lens and the dispersion of the glass. By combining two lenses of proper focal lengths and glasses of suitable refractive indices and dispersions, the axial chromatic aberration can be minimised—that is, two colours, such as red and blue—may be brought to a focus at the same point and the other colours be made to focus very close to this point.

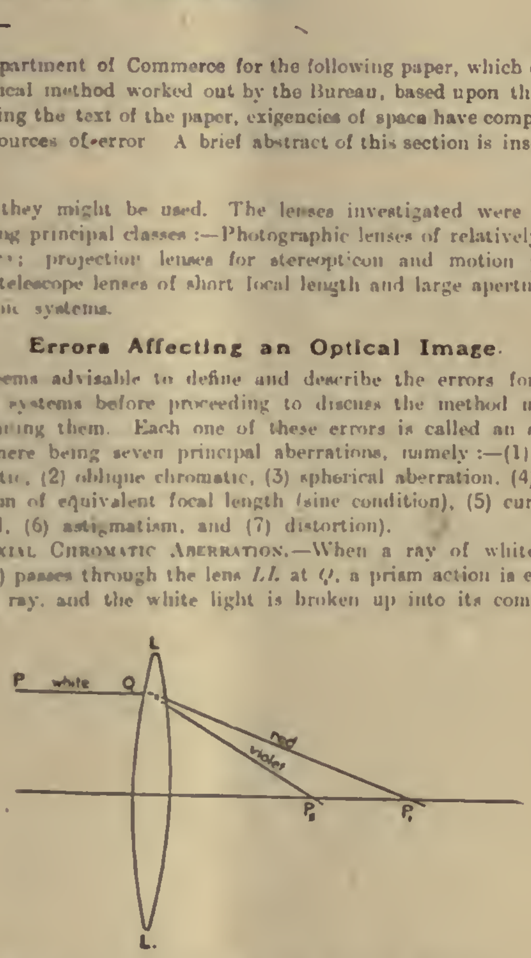


Fig. 1.—Diagram illustrating axial chromatic aberration.

2. Oblique Chromatic Aberration.—Even when all the colours are focussed at the same point, the equivalent focal lengths of the various colours may not be the same, and each colour may give a different sized image, causing the familiar coloured fringes to large objects. A particular example of this is found in the lenses used in three-colour photo-engraving, where, if the focal length for the red is slightly longer than that for the blue, there will be a red fringe to the image. This error is known as oblique chromatic aberration.

3. Spherical Aberration.—Let LL_1 (Fig. 2) be a convex lens, with the axis P_1M, and P_1, P_2, P_3, and P_4 be four parallel rays striking the lens at points Q_1, Q_2, Q_3, and Q_4 at heights h_1, h_2, h_3, and h_4 from the axis. The rays, after being refracted by the lens, will cut the axis at some point. Let the ray from P_1 travelling infinitely near the axis cut the latter after refraction at $P_1{}^1$; then $P_1{}^1$ will be the focus for a paraxial ray (ray very near the axis). The ray P_2, striking the lens at a height h_2 from the axis will, after refraction, be brought to a focus at $P^1{}_2$. The ray from P_4, striking the lens at the extreme edge at a height h_4 from the axis, will be brought to a focus at $P_4{}^1$, nearest to the lens. If V represent the paraxial focal length, then $P_1{}^1P_4{}^1 = \Delta V$ is known as the axial spherical aberration.

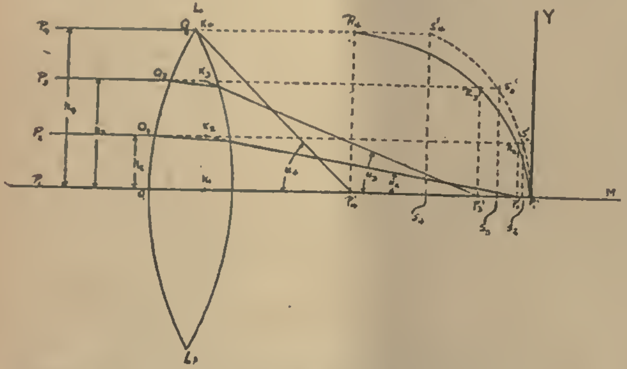


Fig. 2.—Diagram illustrating spherical aberration and zonal variation of E. F. L., and graphic method of representing the same.

If we draw Q_2R_2, Q_3R_3, and Q_4R_4 parallel to the axis, and erect the perpendiculars at $P_2{}^1$, $P_3{}^1$, and $P_4{}^1$; and draw a curve through the intersections $P_1{}^1$, R_2, R_3, and R_4, we obtain a curve which represents the spherical aberration along the axis for any zone of the lens at a distance h from the axis.

In a negative lens (Fig. 3) the ray through the edge zone, if prolonged backward, would cut the axis at a point $P_4{}^1$ nearer the lens than the point $P_1{}^1$, which is the focus for paraxial rays. But here the spherical aberration $P_1{}^1P_4{}^1 = \Delta V$ is opposite in sign from that of the positive lens. The size of ΔV is dependent on the shape of the lens for a given focal length and kind of glass. By combining a positive and a negative lens of the proper shapes and of glasses and focal lengths previously determined by other conditions (axial chromatic, Petzval, and oblique chromatic in photographic lenses, but only axial chromatic in telescope objectives), the spherical aberration of the negative lens may be made to counteract that of the positive lens, and thus be eliminated. In the absence of spherical aberration the curve $P_1{}^1R_4$ will coincide with the line $P_1{}^1Y$.

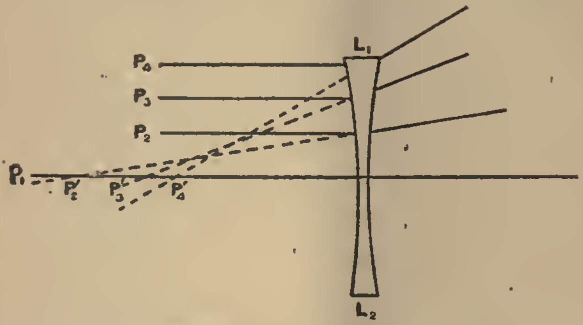


Fig. 3.—Diagram illustrating spherical aberration in a negative lens.

Variation of Spherical Aberration with Colour.—The spherical aberration curves for all colours do not coincide, nor do they run parallel to each other, since the axial chromatic aberration for different zones is different. Hence, if curves are drawn for light of different wave lengths, each curve would represent the axial spherical aberration for that wave length, the variation in the shape of the curves representing the variation of the axial spherical aberration with the colour. The abscissa of each curve for any definite ordinate is the spherical aberration of the zone represented by that ordinate for the given colour. The difference between two such abscissæ is the axial chromatic aberration of the zone for the two colours. Thus, the curves show spherical and chromatic aberrations, and the variation of the spherical with the colour.

E. D. Tillyer.
H. I. Shultz.

(To be continued.)

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

The Council's Report for 1917.

The following is the report of the Professional Photographers' Association, to be presented at the annual meeting on Friday next, March 8, when Mr. A. H. Llewellyn Chapman, of Swansea, will be elected president :—

During the year 101 new members have joined the Association. It is not possible to state with accuracy the actual number of members, as some who have not responded to applications for their subscriptions may have joined up and may or may not return to photographic work and membership. There is, however, no reason to suppose there is any decrease, as the subscriptions collected, 888, is the highest number since the institution of the association. In this respect it has been the record year.

The following table shows the subscriptions collected for the past five years :—

1913	...	777	...	Congress.
1914	...	772	...	Congress.
1915	...	812	...	No Congress.
1916	...	729	...	No Congress.
1917	...	888	...	No Congress.

The business of the Council has necessitated a monthly meeting throughout the year; so, for the first time in the Association's history, this year there has been no suspension of the meetings during the autumn months.

The P.P.A. Circular has been published regularly quarterly, and the considerable number of expressions of appreciation received from members has convinced the Council that the labour and cost of its production have been justified, and will encourage them to further developments and improvements.

Through the kindness and courtesy of the Kodak Company and the Editor of the "Professional Photographer," which the Council gratefully acknowledge, a statement of the constitution and aims of the Association was made in the columns of that publication, and by those means reached every recognised professional photographer in the kingdom. A form of application for membership was enclosed with each copy, and the direct result was the accession of fifty-one members.

The coming into force of the "Registration of Business Names Act" was duly notified to our members, and full particulars of its provisions were set forth in the February number of the P.P.A. Circular. A large number of inquiries resulted, several of them involving intricate points, which had to be considered with deliberation before the application of the Act as regarded them could be determined. In spite of the clear instructions given in the Circular, a considerable proportion of the members liable to registration, etc., seem to have failed to notice or take regard of their obligations. In certainly more than twenty cases letters have been received from members on ordinary matters, written on letter paper, the heading of which clearly did not comply with the law. In all these cases the member has been warned of his omission. The frequency of these cases necessitated a further notice to members generally, which was printed in the November number of the "Circular."

In a few cases the printed heading of letters received included a representation of the Royal arms or words implying that the person or firm enjoyed Royal patronage. When it was clear that the member was not entitled to such use, and that it was an infringement of the Patent Act or Trade Marks Act, a warning has been given.

In August the attention of the Council was directed to a circular letter that was being sent by, or with approval of, the Director of the National Portrait Gallery to certain Navy and Army officers and others in high official positions, inviting the recipient to attend at a certain photographer's studio for a free sitting, in order that his portrait should be included in a collection of portraits to include those of "all persons, naval, military, or civilian, holding important and responsible positions, and others who have rendered service to their country in this great historical epoch by their valour or by the promotion of the welfare of the Empire." As the offers by recipients of the circular to contribute portraits of themselves already in existence were replied to by the firm of photographers referred to, on their own business letter paper, stating that only their photographs would be included in the collection, a letter was addressed by the hon. secretary to the Director National Portrait Gallery, asking if this was the fact. No reply beyond an acknowledgment having been received for some weeks, by direction of the Council a letter for publication was sent to and appeared in certain newspapers, pointing out that the method proposed for obtaining the portraits—namely, that they were all to be produced by one London photographer—must necessarily be ineffective.

A series of advertisements in the London "Evening News," offering its readers colourgraph enlargements for 7s. 6d., from a photograph of anyone serving in the Forces, was brought to the Council's notice. An account of what happened in the case of an order for one of these enlargements was given by the hon. secretary.

A suggestion from Mr. Lang Sims that a fund be raised for the benefit of photographers who have taken part in the war and require assistance on their return to civilian life was considered by the Council. The difficulties were fully recognised, but a committee was appointed to inquire into the matter. Up to the present no decision has been arrived at.

The applications for advice or assistance on business matters have been as numerous and varied in subject as usual. In several cases the Association's opportunity of obtaining a settlement by mediation has been destroyed by our member, after an acrimonious correspondence, having threatened his opponent with placing the matter in the hands of the P.P.A. In such cases, usually, the only resort is to employ a solicitor.

The sale of old negatives to persons who are more anxious to obtain the glass than to pay for it has given us a great amount of trouble, and has necessitated the services of our solicitor. In most cases he has obtained a settlement. Payment has been obtained from a glass company in eight cases with and without the commencement of proceedings. Other cases are still in hand.

Three cases of the refusal to pay for old negatives by their purchasers on account of the glass being unsaleable have occurred. In one case an adjustment was made by consent. In the second there was a contra account, and the legal position remained undecided. The third, which involves a very considerable amount, is being dealt with by our solicitors.

Many complaints of goods ordered not being delivered after considerable lapse of time have reached us. The difficulty in dealing with such cases arises from the impossibility of determining the legal meaning of "reasonable time" under existing circumstances.

Two claims by clients against members for delivery of negatives have been successfully resisted.

Several cases of minor infringements of copyright have resulted in obtaining reproduction fees or small damages for members. In one case £25 were obtained. An interesting case was that of the "Daily Mirror" publishing a number of photographs of naval interest sent them by a petty officer in the Navy. On investigation it proved that the photographs sent to the paper were copies of photographs, our member's copyright. The paper had already paid the sender £12 12s. fees, but handsomely met us by paying our member the same amount.

In another case of alleged Infringement the person complained against had, fortunately for himself, kept the correspondence with our member dated twelve years ago, proving conclusively that the photographs were taken to order and were not our member's copyright.

A complaint of one of our members against another that the latter had endeavoured to induce the former's manager to transfer his services, was held by our solicitor not to be a breach of the Defence of the Realm Act, as the attempt did not succeed. If it had succeeded it would have rendered the offender liable to a heavy penalty.

Two important cases of goods being invoiced at higher prices than the contract price have resulted in the contract price being maintained.

The Fine Art and General Insurance Company have given notice to terminate the arrangement up to the present existing with the Association. The Council are still considering what new arrangement can be made in the interests of our members. The new arrangements will not affect members already insured against fire and some other insurance.

The thanks of the Association are due to the Editors of the "British Journal of Photography" and the "Professional Photographer" for publishing reports, information and helpful reference to the Association's work.

By order of the Council,
ALEXANDER MACKIE, Hon. Secretary.

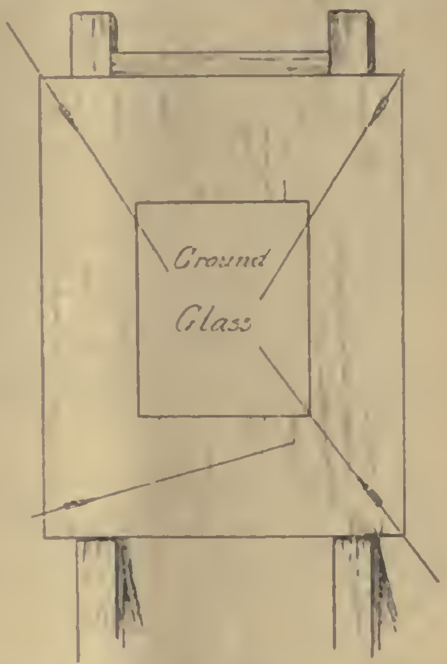
January 12, 1918.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

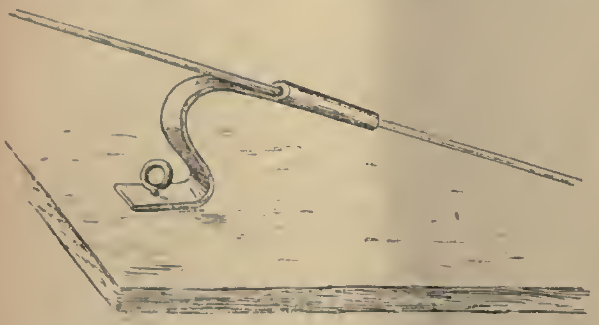
A Useful Easel and Bromide Paper Catch.

Of the various elaborate methods in use for fixing bromide paper to the enlarging easel, and their merits, I have had but little experience, but the following device has been found to work satisfactorily for a number of years in the production of all the various sizes of prints, from postcard to 20 by 16 and over. As regards speed and simplicity, I do not think it can be much improved upon. The easel, working on wheels, is fitted with a square of fine ground glass in the centre, size 12 by 10 flush to the surface of the front of board, and proving a useful means of fine focussing, viewing from the back of easel as with a camera. The paper-clipping rods are, working from the corners, made to fix any size of paper to any part of the easel board within its working area, which is



easily and quickly done without piercing the paper. Also the paper is very quickly removed when exposed.

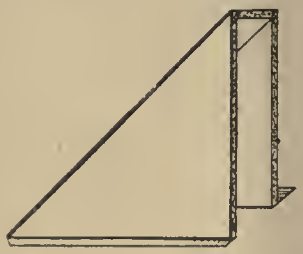
The sketches will help to explain. The spring brackets to hold the sliding rods can be easily made by a smith. They are hardened to give a firm spring. Mine are home-made from pieces of sheet-iron, being first plied into shape and then hardened. They are simply fixed near the corners of the easel by means of a stout screw eye so as to allow of a side to side movement of the whole fit-up across the board; the tubular socket is made just large enough to receive and hold the steel rods firmly against the board when let go (my rods are fairly stout umbrella ribs), and loosely enough held to allow of the whole length being slipped backwards and forwards from corner to centre, and *vice versa*. There will be some spare parts of the rods generally projecting beyond the corner of easel, but not of sufficient length to be much in the way when a good size board is used. These catches will hold plates when required as well as paper.—M. B.



Two Hints on Vertical Copying.

The first is to stick a piece of paper, on which there is some sharply printed type, under a small piece of glass (preferably plate-glass), so that the type shows through the glass. An old c.d.v. cutting shape is quite good for the purpose. This is just dropped on the copy for easy focussing, and will lie in good contact with it.

The second idea is to make a sort of box, as shown in the sketch, to support a piece of mirror on top of the camera, so as to enable one to examine the image by looking straight forward instead of craning one's neck. In many cases where the copy is well lit it will be possible to arrange and to focus the image in the mirror. This may be a piece of ordinary silvered sheet or plate for this purpose, and the box is simply placed in the most convenient way on the camera, preferably so that the mirror faces away from the source of light.—D. B.



Soft Bromide Emulsion on War Paper.

When bromide emulsion shows a tendency to soften or melt, there are various methods of hardening, all of which are more or less effective if the emulsion is on paper or card of pre-war quality.

Dealing with emulsion on paper of recent manufacture, however, does not seem to be such an easy matter, the film apparently not having as good a purchase on the new base.

I have come across a large amount of bromide paper and card during the last six months, the film of which, on contact with hot hypo-alum and sometimes in the case of sulphide, softened and left the base. All this bromide was of well-known makes and high-priced, so the fault was not due to cheap material, but rather to "war paper." One maker who was questioned could give no information about the matter.

The use of alum in sufficient quantity to prevent softening caused the film to crack, split, and peel. Sulphite, acetic acid and alum used as a separate hardening bath gave better results, but was not reliable, some batches of paper being affected by it differently from others. Formalin was no more successful, the waste in all cases being serious.

Fixing prints in a hardening-fixing bath, such as the hypo, sulphite, acetic acid and alum formula, and then treating them with alum (common or chrome), formalin, or saturated hypo solution, only seemed to make things worse, square inches of film sometimes peeling off without being touched.

The only reliable way I ever found to deal with prints on this kind of material, if they are wanted for toning, is that of using a "soft" fixing bath composed of hypo and a very small amount of potass. metabisulphite. By "soft" I mean not too strong or cold—20 per cent. solution at 65° or 70° being about right—as the tendency to crack or blister must be counteracted. After fixing, the prints are washed for about five minutes, soaked in saturated chrome alum solution for about ten minutes, being well turned over and washed again for another ten, after which they are dried. When dry they can be toned with impunity.

An alternative to drying is to allow the prints an hour in the chrome alum, but the former is the safer way when the paper or card is extra faulty.

This may seem more troublesome than leaving prints in a cold bath to tone overnight, but when large quantities have to be toned it is the more convenient method unless one has great accommodation for hypo-alum.—Thermit.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications January 21 to February 16:—

Cinematography.—No. 1,253. Cinematograph projection apparatus. E. E. Halford.

Photometers.—No. 1,473. Photometers. H. Nielsen.

Camera Accessory.—No. 1,826. Optical divergence determiners for cameras. A. Freeman.

Cinematography.—No. 1,812. Kinetographs. H. C. Schlicker.

Shutter Fittings.—No. 1,631. Obturator rings. A. V. Watson.

Films.—No. 2,319. Films. H. Degens.

Cinematography.—No. 2,075. Stereoscopic cinematograph shutters. O. Dimond.

Cinematography.—No. 2,131. Hand-tool for joining cinematograph films. E. W. Johnston.

Photographic Apparatus.—No. 2,026 and No. 2,109. Photographic apparatus. G. de Ram.

Printing.—No. 2,334. Photographic printing. C. J. F. Westman.

Film.—No. 2,742. Apparatus for treating photographic film tape. F. B. Thompson.

Cinematograph Cameras.—No. 2,720. Cinematograph cameras. R. Wellesley.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Colour Photography.—No. 110,089 (February 8, 1917) The invention is of optical means for taking and projecting still and animated colour photographs. In view of the technical details contained in the specification the major portion of the latter is printed in the "Colour Photography" supplement to this issue. The five claims made for the invention are:—

1. Apparatus for taking colour photographs, whether stationary or of the motion-picture kind, characterised in that the rays of light of the component colours are separated at the

surface of a transparent reflector having the quality of selectively transmitting and reflecting the component colours in preponderating degrees.

2. Apparatus for projecting colour photographs, whether stationary or of the motion-picture kind, characterised in that the rays of light of the component colours are blended at the surface of a transparent reflector having the quality of selectively transmitting and reflecting the component colours in preponderating degrees.

3. Apparatus according to claim 1 or claim 2 further characterised in that the transmitting and reflecting capacities of the reflector as to the respective component colours are properly related to the degree degree of sensitiveness or depth of colour of the oppositly located image surfaces.

4. Apparatus according to claim 1 or claim 2 further characterised in that the inclined reflector comprises a plate of glass, either clear or coloured, at the front face of which is applied a superficial layer of a dichroic coal tar or analogous dye-stuff.

5. In or for use in the taking or exhibiting of colour photographs a dichroic dye reflector substantially as described. A. H. Walker, 183, Fleet Street, London, E.C.4, for Hess-Ives Corporation, 1201, Race Street, Philadelphia, U.S.A.

Trade Names and Marks.

REGISTRATIONS RENEWED.

Fago.—No. 259,204. By C. P. Goerz in 1904 (Class 8).

TRADE MARKS REMOVED FROM REGISTER.

In the official language of the "Trade Marks Journal" the following trade marks have been "removed from the register through non-payment of renewal fees." Such non-payment is of course the method adopted by a firm having no further occasion for the use of a mark.

Helion.—No. 259,337. Registered by O. Hehner and P. L. Thornton in 1904 (Class 39).

Helios.—No. 259,336. Registered by O. Hehner and P. L. Thornton in 1904 (Class 1).

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

Bee in B Design.—No. 330,210. Photographs. Fred [illegible] Barnette, 108, Renfield Street, Glasgow, photographer.

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FORTHCOMING EXHIBITIONS.

February 16 to March 2.—Edinburgh Photographic Society. Sec., P. T. Mackintosh, 38, Castle Street, Edinburgh.

March 12 to 15.—Hackney Photographic Society. Sec., Walter Selfe, 24, Pembury Road, Clapton, E.5.

April 18 to May.—Hampshire House, Hammersmith, Photographic Society. Entries close March 19. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12.

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War's History in Colour.—Preparations are proceeding quickly for the first grand exhibition of Imperial war photographs in colour, which will be opened at the Grafton Galleries on March 4. The exhibition has been organised by the Ministry of Information, and the proceeds will be devoted to war charities and purposes.

"Overseas" Snapshot Competition.—A monthly prize of £1 1s. is being offered by the Editor of "Overseas," the monthly magazine of the Over-Seas Club and the Patriotic League, which circulates in every part of the world, for the best snapshot taken in the British Isles. Where possible silver prints should be forwarded in order to facilitate reproduction; and, in order not to infringe the D.O.R.A., only photographs which are already in the owner's possession should be submitted. Entries should be addressed to the Editor, "Overseas," the Over-Seas Club, General Buildings, Aldwych, London, W.C.2.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, March 2.

Stalybridge Photographic and Scientific Society. "The Principles of Composition." J. H. Cronshaw.

Edinburgh Photographic Society. Exhibition Lecture, "A Swiss Pageant." G. W. Wight.

Monday, March 4.

South London Photographic Society. "The Photographic Studio and Premises." Drinkwater Butt.

Dewsbury Photographic Society. "Amateur Photographer." Prize Slides.

City of London and Cripplegate Photographic Society. "Garden Photography." A. D. Fort.

Bradford Photographic Society. Yorkshire Photographic Union Slides and Members' Slide Night.

Tuesday, March 5.

Birmingham Photographic Society. "Some Old Roman Towns of Provence. T. H. Waller, B.A., B.Sc.

Hanley Photographic Society, Y.M.C.A. Annual Meeting.

Sheffield Photographic Society. "From Jersey to St. Malo and Mont St. Michel, Brittany." F. J. Cribb.

Keighley and District Photographic Association. "Amateur Photographer" Prize Lantern Slides.

Hackney Photographic Society. Affiliation Lantern Slides.

Wednesday, March 6.

Croydon Camera Club. Annual Rummage Sale.

Photo-Micrographic Society. Members' Evening.

Edinburgh Photographic Society. "Old Lantern Slides of Old Edinburgh." A. H. Baird.

Thursday, March 7.

Hull Photographic Society. "Composition." Mrs. M. Chaplin.

Huddersfield Naturalist and Photographic Society. Exhibition of the Y.P.U. Prints.

Leigh Photographic Society. L. and C.P. Union Slides.

Liverpool Amateur Photographic Association. "Some Pre-War Holidays in Northern Italy." T. H. Greenall.

Hammersmith (Hampshire House) Photographic Society. "Flotsam and Jetsam." A. H. Lisett, F.R.P.S.

Rodley and District Photographic Society. "Album Making." T. Ball.

Commercial & Legal Intelligence.

A Receiving Order has been made on a creditor's petition against Arthur Heathcote, photographer, lately carrying on business at 22, St. James Street, Piccadilly.

NEW COMPANIES.

New Studios, Ltd.—This private company was registered on February 15, with a capital of £1,000, in £1 shares, as photographers, printers, dealers in pictures and fancy goods, etc., and to establish at Grantham, Peterborough, or elsewhere, branches, shops, studios, factories, agencies, etc. The subscribers (each with one share) are:—G. E. Whysall, Green Hill, Barrowby Road, Grantham, chemist; A. I. White, Glenshira Road, Grantham, certified accountant; G. E. Hadley, 32, Parliament Street, Nottingham, photographer. The first directors are:—G. E. Whysall, A. I. White, and G. E. Hadley. Qualification, 50 shares (solely or jointly). Solicitor, T. Norton, 1, St. Peter's Hill, Grantham.

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Aerial Photography on the Western Front.—In his report, in the House of Commons last week, Major Baird, in giving an account of the progress which had been made in the creation of the Air Forces and Air Ministry, said that in the month of September last year 15,837 photographs were taken in the air.

Photographs, Engravings.—A Manitoba correspondent in the "Board of Trade Journal" asks for names of photographers or engravers in London publishing medium priced portraits of members of the Royal Family. Communications in regard to the foregoing should be addressed to the Office of the High Commissioner in London for Canada, 17, Victoria Street, S.W.1.

Correspondence.

⁂ Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.

⁂ We do not undertake responsibility for the opinions expressed by our correspondents.

METOL AND CHEMICAL POISONING.

To the Editors.

Gentlemen,—In answer to my query in the "Journal" of November 9 last on the above subject, asking for a means by which I could cure myself of metol poisoning, Mr. E. L. Leach, photographer, of Clarendon Street, St. Giles, Oxford, kindly sent me some ointment, which absolutely healed my hands, the skin starting to grow after the fourth days' treatment, and in three weeks I was able to resume my duties, after six and a half months' pain. I notice in last week's "B.J." that Mr. Leach has placed this on the market under the name of Ujah Ointment.

If other photographers suffering as I did will give this ointment a trial they will, like myself, be pleased in having had it brought to their notice.—Yours faithfully, P. H. Adams,

Staff Photographer, "Illustrated Leicester Chronicle."

Leicester, Feb. 19, 1918.

PLATE SIZES.

To the Editors.

Gentlemen,—I agree with those of your correspondents who object to the present standard sizes of plates.

Twelve years' practice with a half-plate and stereo field camera has convinced me that the 7½ in. x 5 in. is much more pleasant in use than the half-plate, both for landscape and portraiture. One of the chief joys in my photography is the composing of the picture on the ground glass, and for this the 7½ in. x 5 in. has, I find, easily the advantage over the half-plate.

It may interest your correspondents to know that a large number of students, when requested to divide a given straight line into two parts, whose proportions should bear the most pleasing relations to one another, made the ratio (on the average) 1.6 to 1 (James's "Psychology"). This is not far away from the 1.5 to 1 as recommended by so many of your correspondents.—Yours faithfully,

Calypso.

DEVELOPER FOR PROCESS WORK.

To the Editors.

Gentlemen,—The photo-mechanical press is at present not in a position to give assistance, so please allow me, through your medium, to help my fellow half-tone operators.

Acetic acid is still fairly easily obtainable, but spirit is a vanishing article. A substitute for the acid-spirit-iron developer has been recommended, viz., an acid-sulphuric and gelatine-iron mixture. I found the latter wanting; the developer gives irregular density, and the after intensification is very trying—in fact, two or three successive intensifications are required.

After a few trials I can recommend the following:—

A. Stock solution:	Gelatine	2 ounces.
	Acetic acid 99 per cent.	20 ounces.
	Water	30 ounces.
B. Developer:	Iron sulph.	4 ounces.
	Stock sol., A	3 ounces.
	Water	50 ounces.

It will be noticed that the amount of acetic acid is less than half that generally used in spirit sol., because the gelatine also acts as restrainer. The resulting negative is every bit as good with this new developer as with the older one, especially if used slightly warm, and before pouring on should be freed of bubbles; the stages during intensification are visible and easily accomplished.

I use ordinary gelatine, what I may call best glue, and not photographic gelatine.

If acetic acid should become still more scarce, a substitute would be vinegar, which can easily be made from apple or pear juice obtained from windfalls or otherwise; such vinegar contains 5 to 10 per cent. of acetic acid. If information is required to make such vinegar, I shall be pleased to give it.

The above A stock solution is also a first-rate substitute for gum on wet plate, giving a perfect protection and a surface which takes the pencil easier and better than any other medium I know of.

Otto Pfenninger.

HYPO RECOVERY.

To the Editors.

Gentlemen,—During the last few days I have been making a series of experiments with the object of the recovery of sodium thiosulphate from exhausted fixing baths. Thinking that the results of my experiments might be of some general interest, I am sending you an account of them.

In the first place, all the experiments were conducted with a plain "hypo" bath, and do not apply to acid baths. My method was to precipitate the silver by passing sulphuretted hydrogen gas through the solution in the presence of ammonia (ammonium hydrate). The silver sulphide was then filtered out and the excess of sulphuretted hydrogen and ammonia boiled off. The strength of the hypo solution was measured by finding the time taken by a definite volume of the solution to clear a strip of photographic film of a definite size. The results were as follows:—

The fresh solution cleared the test film in 18 minutes. The solution was then partially exhausted, until the time taken was 45 minutes to clear a film of the same size. At this stage the precipitation of the silver was carried out as described above, and the "hypo" solution was brought to the same volume as before by the addition of water to replace that lost by evaporation. I now found that the test film required 22 minutes to clear, a result showing that the activity of the bath had been increased in the ratio of slightly more than 2:1.

You will notice that it had not quite regained the strength of the fresh solution, but this was probably due to the loss of a small quantity of the hypo by adherence to the films.

At the time of writing my experiments have not gone far enough to give a full explanation of the chemical processes involved, but I think it probable that a double thiosulphate of sodium and ammonium is formed in place of the one of sodium and silver. In practice I see no reason why ammonium sulphide should not be substituted for the sulphuretted hydrogen gas if desired.—I am, yours faithfully, L. F. E. Johnson.

Highbury Grange, N.

ECONOMY IN HYPO.

To the Editors.

Gentlemen.—In these days of stress and increasing difficulties, any practical suggestions for the economising of either materials or labour should be acceptable to all photographers; so that, following upon the remarks of the editors in recent issues anent the possibility of effecting economy in the use of hypo, my experience and observations in this direction may be of interest.

My usual practice is to employ porcelain tanks for the fixing bath for plates; and I have noticed that when a new hypo bath is in use the plates completely fix out first at the bottom edge and thence gradually towards the top. But, as the bath becomes charged with residual silver, the fixing out of the free silver in the negative becomes slower and slower near the bottom edge of the plate, until the upper part becomes fixed in half the time necessary for the complete fixation of the lower portions. If the bath, when in this apparently exhausted condition, is stirred up immediately before putting a plate in, fixation is practically even all over, and the time for complete fixation is reduced.

This observation led me to deduce that if a much-used fixing bath which had been standing undisturbed for, say, twenty hours, had about three-parts of the whole carefully decanted off into a dish, and the residue thrown into the collecting tub, the decanted solution would be brought to practically its original efficiency by making it up to its original quantity with new 30 per cent. hypo solution. And this I find to be so.

It follows that hypo used for prints may be treated in the same manner, and the saving of hypo be enormous. A hypo bath may reasonably be treated in this manner two or three times before being discarded as a first bath, when it can still be used for several batches of prints as a second bath. For the complete fixation of prints the use of a second or even a third fixing bath cannot be over-estimated. The individual separation of the prints when passed from one bath to another is, of course, essential. It is also good policy occasionally to put a print through the sulphide test for complete fixation.

Economy in hypo may be further effected, and much labour saved, particularly by single-handed printers in bromide, by the use of a stop bath when developing. I have made inquiry, and find that very few photographers know of the great advantage of the use of a suitable stop bath. In wintry weather, when the temperature of tap-water wavers around freezing point, the stop bath is a friend I would not be without for gold. As a means of keeping the fixing bath free from developer it is perfectly effective. After many experiments, with the particulars of which I will not bore you, I have decided that tartaric acid makes the best bath for the purpose. One ounce of tartaric acid crystals dissolved in 120 ounces of water is sufficient for 500 half-plate prints or post cards. The procedure for use is as follows:—A batch of, say, 100 prints is exposed. These prints are placed in a pile, conveniently near the worker's right hand, and on his (or her) left is placed a fair-sized—say, 15 by 12—dish containing the tartaric acid solution. The prints are placed two at a time into the developer at intervals of about 30 seconds, and as development is completed the developer is allowed to drain off, and the prints transferred to the stop bath, which arrests further development, until the whole of the batch has been developed. In this way considerably more than 200 prints can be comfortably developed in an hour. The batch is then placed in a large dish of running water and the prints turned face downwards one at a time. When all have been so treated they should be lifted up as a batch and allowed to drain on the left hand while transferring them one at a time into the first hypo fixing bath.

An alternative method for dealing with a large quantity of bromide printing single-handed is to get the whole of the day's prints exposed before commencing development of anything more than mere tests, and then proceeding as detailed above until all the prints are developed. As the stop bath gets overcrowded, lift the prints out in a batch, and, after a superficial draining, drop them face downwards into a large dish or trough of water and leave them, proceeding with development of the remainder of the prints. When development is completed the whole of the batch is rinsed in water and drained; but for fixing two dishes of hypo are used, the prints being transferred singly from one dish to the other. Dealing with 500 prints, two complete changes in this way are sufficient for complete fixation.—Yours truly,

10, Russell Street, Stroud, Glos. HENRY J. COMLEY.

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SUMMER TIME MARCH 24.—The Home Secretary has announced in the House of Commons that summer time will be brought into force this year on the morning of Sunday, March 24, and will continue until the night of Sunday, September 29—a period of twenty-six weeks. This is a somewhat longer period than last year, when summer time began on the second Sunday in April and ended on the third Sunday in September. The Home Secretary, in coming to a decision, has had to take into consideration the exceptional circumstances of the present year. The shortage of foods makes it a matter of the first importance to increase as much as possible the production of food on allotments. The Coal Controller also, with the unanimous approval of his Advisory Board, which includes representatives of the Miners' Federation, has, in view of the difficulties of transport and the necessity of economising fuel, urged strongly an earlier commencement of summer time in order to reduce the consumption of gas and electricity. The dates which have been fixed will give an additional five weeks of summer time this year, and will, it is hoped, cause no serious inconvenience to any class. The extended period is to be regarded as an exceptional measure for the present national emergency.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

FERROTYPE.—These plates are usually coated with collodion emulsion. It would take up too much space to give detailed instructions, and then a year or two's experiment would probably be necessary before you turned out a decent plate. You might write to Penrose and Co., Farringdon Road, to inquire if they could supply the emulsion.

GLAZING BROMIDE POSTCARDS.—How can I glaze bromide postcards on glass very simply, as I cannot get methylated spirits now?—W. A. H.

The glass must, of course, be perfectly clean, and the cards hardened in a formalin or alum bath. Before squeegeeing the cards down the glasses should be rubbed over with a pad saturated with prepared ox-gall or one of the advertised glazing solutions. The glasses, with the cards on, should then be taken into a fairly warm room and kept at an even temperature until the cards drop off.

PINHOLES IN ROLLER BLIND SHUTTER.—I should be much indebted to you if you could give me advice with respect to the following:—I have a "Nettel" focal-plane camera, the blind of which has become covered with pinholes, the blind having a tendency to crack through winding on roller. Coull you tell me how to fill in the holes so as to make the blind efficient?—J. S. B.

The only thing to do short of fitting a new blind is to mix up some lamp-black with rubber solution and rub it into the holes on the fabric. Allow it to dry as long as possible and then dust a little French chalk over to prevent sticking.

INSTRUCTION IN PHOTOGRAPHY.—You will get a good general knowledge of photographic processes and principles of lenses from "Photography of To-day," by Chapman Jones, or, by the same author, "Science and Practice of Photography." Our publishers also supply two small manuals, "Commercial Photography" and the "Portrait Studio," which both contain a good deal of information in a condensed form. We believe that the Regent Street Polytechnic will give postal lessons. You should write to Mr. A. J. Lyddon, School of Photography, Polytechnic, Regent Street, W., stating the particular subjects for which you require lessons.

LENSES.—1. Will you kindly inform me what extension of camera should I require with a lens of focal length of 12 ins. or 14 ins.? 2. Would you advise a 12 in. lens, rectilinear type, for professional work?—THOMAS BATE.

1. The 12 ins. lens would need an extension of at least 15 ins., and the 14 ins. one of at least 17 ins. for ordinary purposes. You could get quarter full-size images with these extensions, while bigger images would need still more.

2. We should say it is far too long a focus unless you can get a long way off, and then you would need good light. Much better to use an 8 in. anastigmat.

HAND-COATING PLATES.—The easiest way to coat plates by hand is to keep the warm emulsion in a small Japanese teapot, having provided yourself with two or three levelling stands (each made by putting three screw-eyes into a piece of wood and screwing them in until a plate on them is truly level) and a glass rod bent into a triangle. Put a plate on the levelling stand, pour on the requisite quantity of emulsion, spread with the glass rod, and allow to set. By the time you have coated three plates—at this time of the year—the first should be set enough for the drying box. The plates should not be too cold, or the gelatine will set before you can spread it. Put on no more than is necessary, so that there is no surplus to pour off.

Artificial Light.—What would be the most suitable light for taking photos in a room 20 ft. x 7 ft. x 7 ft. high? It is on the ground floor. I want to turn it into a studio principally for postcards and stickyback size. My camera is a half-plate, R.R. lens, working at f. 8 largest aperture.—E. S.

If electric current is available, half-watt lamps or an enclosed arc, Toplight pattern, would be the most suitable. Otherwise you must use incandescent gas or the Kitson or Blanchard oil light. But either gas or oil lamps will make a small room very hot unless you have exceptionally good ventilation. You might try the Tress "Surelight," which is a combination of gas for focussing and flashlight for exposure.

Photographic Chemistry.—Is there a photographic or chemical work dealing with the chemical equations involved when light, developer, or hypo comes in contact with modern emulsions?—J. H.

The action of light cannot be described by chemical equations, while that of the developer cannot be expressed in detail. Rather more definite information exists with regard to the action of hypo, but even here the precise course of events is somewhat involved and not exactly known For such general matters as these you had better study Mees and Sheppard's "Investigations on the Photographic Processes." With regard to fixing, you will also get some useful information in the paper by Lumiere and Seyewetz which appeared in the "B.J." for August 16, 1907.

Lenses.—1. What lens is suitable to take photograph of room of short length? Quarter-plate size would suffice.

2. To copy same size, or enlarge from small photo (print) on to a whole-plate, what lens is suitable so as to avoid placing the camera so near the object as to interfere with the lighting of the print to be copied or enlarged?—C.

1. If you wish to include a wide angle you should use about a 3-in. lens, such as the Dallmeyer wide-angle rectilinear stereo lens (3-in.), or most of the modern anastigmats would be suitable.

2. We have found a 6½-in. or 7-in. anastigmat most convenient for this purpose. If you have sufficient bellows extension, a 9-in. would be better. It is a good plan when enlarging to fit the lens to a small cone extension, as this does not cut off so much light.

Condenser Sweating.—Would you kindly advise me in regard to an enlarging lantern, which I have just purchased. I find on using that the condenser (8½-inch) sweats very badly. I have tried the upright incandescent mantle, also the inverted, but without success. It seems better when I have the metal back of the lamp house removed, but condenses again directly I cover the back with material, even. Is there a preparation I could make up to prevent this sweating of the condenser? Your valuable advice will be greatly esteemed.—S. T.

The "sweating" of the condenser is due to the glass being cold. If you warm it well before the fire or over a stove you will not find this trouble; the condensed moisture will evaporate more quickly if some holes are bored in the metal ring which holds the glasses. If you cannot warm the condenser otherwise, light up the lantern, say, half an hour before using. When the condenser is warm the "steaming" will clear off. It is of little use to try to wipe off the moisture.

Residues.—In saving the old hypo baths, will you please say whether the sodium sulphide, after being used for toning, would be sufficient in itself for throwing down all the residue?—Rex.

No. The solution is far too weak for this purpose. You need a strong solution of sulphide, or it is better still to throw in the undissolved crystals. There is no need to worry about a solution until the time comes for testing.

X.—1. Yes. 2. All a matter of taste and dependent on subject. 3. Any angle in excess of that required to cover the plate is likely to produce fog, hence the use of lens hoods. 4. Focus on a pinhole with a bright light behind it and see what kind of image is produced. 5. This is well known R.R. lens of fairly useful quality. 6. We believe it to be an excellent lens for out-of-focu work, but doubt if any stopping down will make it work like a R.R. You should address a question of this kind to the maker 7. We do not understand this query. Too great a focal lengt generally involves too great an angle as well. 8. If you canno change the panel the only alternative is to get an adjustable len flange.

Removing Printer's Ink.—A customer gave me an orde for 600 12 in. by 10 in. enlargements for an advertising scheme he had in hand. Printed matter detailing the nature of the subjects had to be printed on th mounts by a printer as per his (my customer's) instructions, also the word "copyright" had to be written on each in writing ink. I had the 600 12 in. by 10 in. mounts, which were "cream on grey," printed by printer, also had the word "copyright" written o each tint in writing ink. I supplied 100 copies to him wit enlargements mounted on same. He seemed well pleased with same at the time. Recently I have received a communicatio from him cancelling the rest of order, stating that, owing to unforeseen circumstances, he will not be able to carry out the scheme he had on hand. I am now left with just over 500 12 in. by 10 in. cream on grey mounts, which I cannot use, owing to same containing printed matter, printer's ink, and ordinary writing ink. Can you suggest any means, chemically, etc., which would enable me to remove the inks, the printer's ink and the writing ink, on tints of mounts? Have tried turpentine and salt, also oxalic acid, but these do not seem to be effective. I should, if possible, like to remove inks without injuring the mounts, so that I can use mounts for various enlargements, etc. Your advice on this matter, or some of your correspondents, would be greatly esteemed.—Anxious.

We know of no way of removing printer's ink, and you could not deal with the writing ink in any way that would not show on the delicate surface of a mount. Your customer ought to pay for the mounts that have been wasted in this fashion, even if he does not want the enlargements, and if you had a firm order to prepare 600 you have quite sufficient grounds for demanding the money. The cost of the 500 mounts should not be great compared with that of the 500 enlargements that he has countermanded.

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SUMMARY

The second portion of the paper by Messrs. E. D. Tillyer and H. I. Shultz, of the United States Bureau of Standards, appears on page 113.

The experience of photographers in districts where the water supply is soft is that it can by no means be dismissed as a factor in the production of blisters on prints (p. 109).

The first portion of the twentieth Traill Taylor Memorial Lecture, in which Professor Bothamley deals with reduction, alkali [illegible], chromium intensification, and intensification and toning by the sulphide process, will be found on page 111.

Plate sizes as considered in relation to the proportions of the pictures which are likely to be placed on them are dealt with in a paragraph on page 110.

The way to effect considerable economy in the use of plates and paper by adopting a system of step exposures on both plates and bromide paper, with a suggestion for adapting the dark slides to the purpose, forms the subject of an article on page 110.

The subject of reclaiming hypo is referred to again in two paragraphs on page 109.

At the exhibition of war photographs in colour at the Grafton Galleries the process appears to be that of sepia toning followed by the skilful use of the aerograph (p. 116).

A further Order, under the Defence of the Realm regulations, which prohibits photography and sketching within certain of the home counties, and includes the Metropolitan police district, is summarised on page 120.

Sharp enlargements, hypo recovery, plate sizes, and developer poisoning are the subjects of letters from correspondents (p. 118).

Representatives of trade and technical journals met at the Commercial Intelligence Department of the Board of Trade on Monday last with the object of examining a large number of samples of goods of enemy origin. Among these exhibits photographic goods were not conspicuous (p. 119).

A note on the British Industries Fair, at which photography [illegible] a far too small a part, appears on page 117.

The importance of a good negative and not placing too much reliance upon variations of paper or developer is the subject of a contribution to "Assistants' Notes" (p. 115).

Studio lighting and decoration, lens matters, stained prints, and [illegible] residues are some of the subjects dealt with in "Answers to Correspondents" (p. 119).

A report of a Tribunal appeal, in which the decision appears to press rather hardly on a photographer who is serving his country, will be found on page 118.

EX CATHEDRA.

Reclaiming Hypo. It is interesting to note that, following our paragraph of a week ago, the recovery of hypo from spent fixing baths has engaged the attention of correspondents. The throwing down of the silver with sulphide is the most obvious method from the chemical standpoint, and of the various forms in which sulphide can be used hydrogen sulphide gas is chemically the best, as it is practically the most unsuitable for the average photographer. But, looking at the matter simply from the experimental standpoint, which is all that can be done at present, no useful purpose is served, we think, in adding ammonia along with the hydrogen sulphide; certainly none if it is contemplated to get rid of the excess of hydrogen sulphide by boiling. The ammonium sulphide which is formed is much less easily dissociated. So far as we can see there is little hope for these sulphide methods of regenerating hypo unless somebody can hit upon a reagent—oxidiser or reducer—which is innocuous in itself, and is also capable of sharply converting the excess of sulphide into an inert body whilst leaving the hypo itself untouched.

* * *

Economy in Hypo. Mr. H. J. Comley's letter in our issue of March 1 draws attention to a very practical point in hypo economy. It is a fact, as he says, that hypo has a great tendency to sink in solution, while partially exhausted hypo, being still heavier, tends to accumulate at the bottom of the fixing vessel. We have just had a striking instance of this in the case of a very badly exhausted bath, which still possessed fixing power near its upper surface, but none at all in its lower layers. If a bath is perfectly clean but just beginning to slow down in its fixing qualities, it is a simple and safe expedient to let it stand overnight in a suitable vessel, and in the morning draw off the upper half for addition to new bath, while the lower half goes to the residue tub. Mr. Comley's practical experience is so great that his advice in this matter, and also in that of the all-important stop bath, is worth careful consideration. It is, however, to be feared that many modern workers are very indifferent to the cleanliness of their fixing bath, and are just as loth to use a stop bath as they are to use a clearing bath, though the advantages of both are distinctly apparent.

* * *

Blisters and Town Water. We cannot but think that had Mr. John H. Gear numbered among the privileges of his life that of living in Birmingham or Glasgow he would not have dismissed the quality of the wash-water as a factor in the blistering of prints so lightly as he did at a recent meeting of the Royal Photographic Society. He there stated that "he did not believe that there was a sufficient difference in town water to cause blistering in one case and not in another." Perhaps he and we have a different idea of blistering: a subsequent passage suggests the occurrence of blisters by mishandling of prints. We have in mind when we speak of blisters a crop of minute pin-point air-bells beneath the emulsion film, and it is certainly within our experience that photographers compelled to use water almost as soft as that obtained by distillation—and the water from the Welsh hills and the Scotch lochs answers to this description—find it by no means a negligible factor in working emulsion papers without blistering. If we remember right, it was Mr. Harold Baker, of Birmingham, who first consistently laid emphasis on the need of special hardening baths, as an offset to wash-water of this kind, when sulphide toning first began to come into general use.

* * *

Business Management. The announcement that the School of Technology at Manchester is about to establish a lectureship on Business Management, and to encourage study and research in this most important matter, is distinctly a good sign of the times, for, up to the present, business managers have too often seemed to trust rather to instinct than the training for the details of their work, the natural result being not a few dismal failures. It is to be hoped that every encouragement will be given to the research aspect of the matter, for business management is by no means a cut-and-dried science that can be taught like a branch of mathematics. It includes complex matters like that of costing, for example, which in itself is a subject that no one can claim to have mastered; and also economics, which has been a favourite plaything of politicians and philosophers for many years, and has been not a little confused by numerous false prophets. In both these subjects there are many points that can never be reduced to matters of rule, and both need the most careful and unprejudiced study and research from numerous points of view. We would suggest that it would be very advisable to include among the lecturers some who are familiar with the bigger aspects of economics as they affect the world in general, and world finance and prices in particular. A quite false view is often obtained by considering such questions as they affect one or more trades only, and the bigger and broader aspect of the matter is as important as the study of "big maps" is said to be to strategists.

* * *

Plate Sizes. A recent letter on this subject by "Calypso" makes reference to an interesting point. He mentions that a number of students when asked to divide a line into two portions that should bear the most pleasing relations to one another made the ratio 1.6 to 1. A better test than this is to draw a rectangle that shows the most pleasing proportions, and if due care is given to the operation and a sufficient number of trials is made the almost invariable result will be a rectangle of the proportions of 3 to 2, placed horizontally. This is not purely a matter of psychology, but one that can be explained in a very large measure by simply studying the phenomena and mechanism of vision. It is, no doubt, a result of this phenomenon (if we may call it so) that so many seem to think that 3 x 2 are the best proportions for plates, but there are further points to consider. If when we have drawn such a rectangle we proceed to divide it up, say by one straight line in any direction, we shall very likely find that the result is then far from pleasing, and we shall not only have to be extremely careful where we place the line, but will also very likely feel compelled to alter the proportions of the whole thing. As a matter of fact the most pleasing proportions for any kind of picture depend on the picture, and on the way in which its lines and masses cut up, or fill, the space. No one ratio of width to height will suit all subjects, and every careful landscape worker will appreciate this fact. In portraiture variations are not so often needed. Head studies and full lengths will need different proportions, but the former will usually fit very pleasingly into a 4 x 3 or 3 x 2 space, while the latter will nearly all fit well into one or two stock proportions. The 4 x 3 ratio seems to have been derived from paintings, painters usually adopting this ratio for portraits. It is, however, undoubtedly too square for a horizontal rectangle, and 3 x 2 is much more generally useful, though trimming is an operation that we can never dispense with.

TRIAL EXPOSURES AND ECONOMY.

In these days when universal economy is rapidly becoming a matter of necessity there is no detail of daily practice that is not worth investigating from the waste-saving point of view, and one very important detail is certainly that of trial exposures. In spite of the fact that numberless methods of estimating correct exposure exist, it is nevertheless a fact that in a vast number of cases workers prefer an actual trial, and experience shows that, after all, nothing is so absolutely reliable as this expedient. In most cases, however, the trial is made on a full-size plate or full-size piece of paper, the operator thinking that if this first trial proves a success he will have saved material. He will, of course, have done so, but the odds, in our experience, are against the success of the first attempt. It may be moderately good, but not so good as it should be, in which case quality suffers; or it may be bad altogether, which means that on this one trial sufficient material has been wasted for several trials. Indeed, it not infrequently happens that on the first trial proving a failure the second is not exactly a success, so that a third becomes necessary, and this doubles or trebles the waste.

The mistake, of course, consists in attempting to do things by halves; instead of weakly hoping that the first attempt will prove a success it is far better to decide definitely that it is to be a trial exposure, and nothing else; in which case we need not use a larger plate or piece of paper than is necessary for an efficient trial, while we can make a series of exposures in steps, so as to make sure of gathering definite information. The material used in this way is not wasted, because from it we gather definite and important information.

A trial of this type is very necessary in enlarging, while it is extremely useful in copying work when we have not the advantages of standardised illumination, etc. It is also sometimes useful for getting critical focus when this is essential, in which case we can test the effect in one or two positions of the focussing screen, both inside and outside the one position that, visually, appears to be correct. Thus we sometimes need trial exposures on printing paper and sometimes on plates. The former case is easy to deal with, and the most economical way of making due provision for such trials is to take a few sheets of paper belonging to one particular batch, cut them up into suitable strips, and store them ready for use in a special box. Paper-makers generally include in each packet of cut papers one small piece especially for trials; thus in a 10 by 8 packet we may find a 5 by 4 separate piece inserted for this purpose. As a matter of fact, these are seldom so satisfactory as longer strips, and so, as a rule, we prefer to collect and store the small pieces for making small prints, and cut up one of the bigger sheets into strips for trials. There is no extra waste here, because one 10 by 8 sheet will probably suffice to give all the strips required for four packets of paper, whereas the four 5 by 4 pieces provided can do no more, and will probably not do so much, with the same efficiency.

While the use of trial strips in the case of bromide paper is not uncommon, very seldom do we see the same expedient used in the camera. Though half a quarter-plate is as efficient for a trial as a complete one, yet few will hesitate to use the latter, while we have even seen three 10 by 8 plates wasted in the attempt to arrive at the exact best exposure on a special subject, though a quarter of one plate would have been sufficient. The alternative to employing strips of large plates for trial purposes is to use a small plate in a carrier. It seldom happens, however, that a small plate coated from the same batch of emulsion is available, while in any case the mere testing of the effect produced in the centre of a large plate is not an adequate test for the margins, which may require just a little more exposure, or, perhaps, a reduction of the stop aperture to secure uniformity of illumination. Nothing is so reliable as a long strip that will reach the margins; therefore it is best to sacrifice one plate at the start for the provision of test strips.

Plate strips must be cut the long way of the plate, as the only means of giving a series of exposures in strips is to make use of the shutter of the slide, which invariably draws out longways. A 10 by 8 plate will make four serviceable 10 by 2 strips, and if we provide also two 10 by 3 strips, cut from an old useless negative or spoiled plate, or from stiff millboard, it is an easy matter to load the slide with a trial strip centrally. It is a good plan to keep the cut strips in a plate box fitted with a central division, so that the trial strips can be kept in one side and the packing-up strips in the other. If these latter are of glass, they can be covered with paper gummed on, and then they can be distinguished from the trial strips by touch. If one feels reluctant to cut up a plate into four trial strips on the ground that two or three may never be needed, a little ingenuity in mapping out the plate will provide one or two trial strips and one or two plates of smaller size. Thus a 10 by 8 will cut into two 10 by 2 strips and two 5 by 4 plates; or into one 10 by 1½ trial strip, two full-size stereo plates, 6¾ by 3¼, and two lantern plates, size 3¼ by 3¼. Other size plates will cut up differently, but when possible it is best to arrange matters so that pairs of smaller plates can be produced, as these are more safely stored than single plates if packed face to face. We may add one more case in which trial exposures on strips are very useful, and that is when preparing bromides that are to be sulphide toned. Very much here depends on the printing exposure, and if a strip is prepared and put through the sulphiding process the best possible results can be secured with certainty.

SOME MINOR PROCESSES OF PHOTOGRAPHY.

(The Twentieth Traill-Taylor Memorial Lecture delivered before the Royal Photographic Society by C. H. Bothamley, M.Sc., F.I.C.)

Mr. J. Traill-Taylor, in whose memory this lecture was founded, had an intimate acquaintance with all branches of photography as it existed in his day. He made a special study of photographic optics at a time when that branch of knowledge was comparatively neglected in this country, and consequently his name has always been associated more particularly with those studies. I believe it is correct to say that almost all the previous memorial lectures have dealt with some section of optical phenomena, or, at any rate, with some branch of physics. Mr. Taylor's knowledge and sympathies were, however, by no means so restricted. Those who knew him will remember that he was keenly interested in all the details of photographic practice and had an almost uncanny acquaintance with the origin and history of various processes. He never laid claim to chemical knowledge, and I was never able to find out to what extent he was a chemist; but it is noteworthy that his name appears as the responsible editor of the last edition of Hardwich's "Photographic Chemistry," a book which is still of considerable interest, and a careful perusal of which might lead to some "new discoveries," just as the malicious used to allege thirty or forty years ago that certain alleged discoveries in chemistry were merely the results of diligent excavation in the mine of forgotten information contained in Gmelin's great "Handbook of Chemistry."

It was consideration of these facts that led me to think, when I accepted the honour of the invitation to deliver this lecture, that it would not be inappropriate to bring before you certain matters concerning processes which are of everyday utility. Had I known eighteen months ago of the extent to which I should be hampered by those difficulties of office staff and increased work which the war has brought to so many of us, I should, I admit, have hesitated to accept the invitation, and I have to beg your indulgence if some of my experiments seem to be incomplete, and to ask you to regard the results as preliminary only. Later on I hope to be able to carry the work farther in certain directions.

I propose to deal with three well-known processes—namely (1) reduction with alkali persulphates; (2) intensification with the aid of potassium bichromate; and (3) intensification and "toning" with potassium ferricyanide as the intermediary, my object being to clear up certain discrepancies between published statements and to ascertain what are the real essentials to successful working. To this end I have taken special care to use chemicals of a very high degree of purity, and to wash all soluble salts out of the negatives or positives experimented on, using carefully distilled water for the final washings.[1]

The negatives (or positives) experimented with were a very mixed lot of subjects; many of them were not made by me, and many of them were several years old. Some had been developed with pyro-soda, some with hydroquinone, and some with metol-hydroquinone, so that, as a whole, they provided sufficient variety. All were soaked in water for at least twenty-four hours before being treated with any chemical reagent.

The strip negatives made in the course of the experiments were developed with diamidophenol and sodium sulphite without bromide.

Ammonium Persulphate.

The alkali persulphates were first prepared in 1891 by the late Dr. Hugh Marshall, who observed that their properties included the power, when in aqueous solution, of dissolving finely divided silver by converting it into silver sulphate, the alkali persulphate being reduced to sulphate at the same time. It was observed later that this change goes on more rapidly after some silver has already passed into solution, and the rate of the reaction can be markedly accelerated from the outset if a small quantity of a suitable soluble silver salt is added to the persulphate solution before it is poured on the metallic silver. The practical importance of this fact will be referred to later. It was also found that the aqueous solutions of the persulphates alone gradually decompose when kept even at the ordinary temperature, oxygen being liberated whilst alkali sulphate and sulphuric acid remain in the liquid. The solutions of ammonium and potassium persulphate are neutral to litmus when freshly prepared without the aid of heat, but gradually become more and more acid on keeping.

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[1] The last wash-water was always tested after it had been in contact with the film for some time.

In 1898 the use of alkali persulphates as reducers for photographic images was proposed by MM. Lumière, on the ground that they not only dissolve the silver image, but do so in a peculiar way, acting much more rapidly on the dense parts of the image than on the thin parts, so that the contrasts of the image are greatly reduced, with a consequent marked improvement in the printing quality of negatives which for any reason are "hard" or too strong in contrast. A reducer possessing such a valuable property as this naturally attracted much attention, but it is noteworthy that statements of different observers concerning its action are more or less contradictory, and the conditions necessary for successful working do not seem to have been fully grasped. It is not improbable also that the persulphates sold as "photographic" chemicals have varied considerably in quality. Be that as it may, so experienced a photographer and chemist as the editor of one of our leading photographic journals stated not long ago that he had practically given up the use of persulphates as reducers because of the uncertainty of the results.

It is singular that there has been a tendency to attribute practical failures to some inherent difficulty in the process, rather than to the probable presence of avoidable impurities in the persulphate or in the photographic film. The fact that a white precipitate may appear in the liquid whilst reduction is going on was quickly recognised, and one of the most experienced practical photographers now living regarded this (at one time, at any rate) as a distinct advantage, because it showed that the reaction was taking place ("B.J. Almanac," 1904, p. 772), and more recently it has been proposed to base a "time" method of reduction on this phenomenon (R. B. Hughes, "Phot. Monthly," 1909, p. 207). The appearance of this white precipitate certainly indicates that the reaction is proceeding, but also shows clearly that it is proceeding in the wrong way. If the reaction is going on properly, and producing only silver sulphate and alkali sulphate, as it ought to do, no precipitate should form at all. A clear gelatine film (exhibited by the lecturer) was originally an extremely dense over-developed negative, but the image was completely removed by ammonium persulphate without any precipitate or even cloudiness appearing in the liquid throughout the process. In fact, in the numerous experiments made in this series with the alkali persulphates, no trace of milkiness appeared except in one instance, when, through inadvertence, the tap water (which contains rather more chlorides than is usual) had not been washed out of the film. It is easy to prove that this milkiness or white precipitate consists of silver chloride or bromide, usually the former, and its formation is due to the presence of a soluble chloride or bromide in either the persulphate solution or in the film under treatment. The mischief is that if silver chloride or bromide is being formed in the liquid it may be taken as certain that it is also being formed in the film to a greater or less extent according to circumstances. It is possible, in fact, for the silver image to be largely converted into silver chloride if it is acted on by a solution which contains a chloride as well as the persulphate, because as soon as the silver is converted into sulphate it is at once precipitated as silver chloride, more or less completely according to the relative concentrations of the silver salt and the soluble chloride. In fact, a mixture of a persulphate and a chloride has been proposed as a bleaching agent.

[An exhibit showed this point clearly. A dense image, treated with persulphate containing a considerable proportion of chloride, had been largely converted into silver chloride, as the colour and general appearance showed. One end had been dipped in a fixing bath, which had removed a considerable part of the image, whilst the other end had been dipped in a developer which had reconverted the chloride into metallic silver.]

Experiments made with "strip" negatives show conclusively

(*a*) That the alkali persulphates markedly reduce the contrasts of a negative by dissolving the dense parts of the image at a far greater rate than the less dense parts, in agreement with previous statements, and that the flattening of the scale of gradations is more marked the longer the persulphate is allowed to act. In some of the specimens exhibited the higher densities, although distinctly different in the original negatives, had become not only much reduced, but practically indistinguishable from one another. This is a necessary consequence of the fact that

(*b*) The rate of action of the persulphate increases with the mass of silver present; the higher densities are reduced more rapidly than the lower, until the whole image is reduced to one uniform density.

(*c*) That the rate of action of the persulphates is increased by the presence of free acid.

(*d*) That the rate of action of the persulphate is increased by the previous addition of a small quantity of a soluble silver salt, preferably the sulphate.[2]

(*c*) That if the persulphate is made alkaline by the addition of ammonia, the reducing action is not stopped, but is made much slower, as Namias stated ("Eder's Jahrb.," 1901, 166).

The exact mode of action of the persulphate on the silver deposit was made clear by the experiments of J. I. Pigg ("Brit. J Phot. Almanac," 1904, 894-99) and W. Scheffer ("B.J. Phot.," 1906, 964). Pigg made photomicrographs of a half-tone screen negative (wet plate) before and after treatment with persulphate, and showed that whereas the ferricyanide and hypo reducer attacks the smaller grains and completely dissolves them before producing any marked effect on the larger granules in the middle of each "dot," the persulphate attacks the larger granules first and reduces all the granules to practically the same size before the smaller granules are dissolved or even appreciably reduced.

Scheffer made photomicrographs of sections of an exposed and developed film, and found that with hypo and ferricyanide the silver in the uppermost layer of the film is completely dissolved before the deeper parts of the deposit are attacked to any great extent—i.e., the deposit representing the shadows is removed, whilst much of the deposit forming the higher lights is left. With persulphate, on the other hand, action takes place uniformly throughout the deposit, and is conditioned mainly by the size of the silver granules. The persulphate solution penetrates the film rapidly, but acts on the silver somewhat slowly. The hypo and ferricyanide mixture penetrates the film slowly, but acts on the silver rapidly.

Practice.—Ammonium or potassium persulphate can be obtained at a moderate price even at the present time, and of a very high degree of purity as regards freedom from haloid salts, if purchased from any of the principal dealers in fine chemicals. The ammonium persulphate is preferable to the potassium salt, because a solution of the latter stronger than 2 in 100 cannot be prepared at the ordinary temperatures. It is not advisable to use the ammonium salt stronger than 5 in 100, even in cold weather, and 2.5 in 100 is strong enough in warm weather; or if the solution contains free acid, as it does after it has been prepared for a few days. The solution must be made with cold water, and it is most desirable that distilled water, or at any rate water free from chlorides, should be used for this purpose. The solutions decompose gradually, gaining free acid and losing persulphate, but if kept cool and out of strong light the rate of change is slow. The ammonium salt dissolves readily in water, and there is no need to make up a large volume of solution at one time.

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[2] Some workers add silver nitrate solution to the persulphate in order to accelerate the action, but this is undesirable, because with this salt a precipitate of silver peroxide is formed and an unnecessary complication is introduced. No such precipitate is formed with silver sulphate. As a matter of fact, except in very cold weather, a 5 per cent. solution of the persulphate acts as quickly as is safe. When an accelerator is really necessary a few drops of dilute sulphuric acid is the best thing to use if silver sulphate is not at hand.

The negatives or positives must be *thoroughly* fixed and washed; if they have been dried they should be soaked in water for at least three or four hours in order to avoid uneven action. They should be washed in three or four changes of distilled water to remove any soluble chlorides; the volume of water used for each washing need not be large, but each quantity should be allowed to act, with frequent rocking, for not less than five minutes (longer is better) and the draining between successive washings should be thorough.[2] The film must be free from finger marks and greasy patches. It is most important that the plate or film should not be handled with dirty fingers after it has been placed in the persulphate solution. Some form of lifter should be used if possible; if the fingers must be used they should be rinsed under the tap (and not wiped on a towel) immediately before touching the plate. The worst failures I have seen in the use of persulphate were due to handling the plates with fingers that were supposed to be clean, but were not. If the precautions specified are duly observed, the reduction with persulphate is, in my experience, a safe and certain operation, the principal risk being that the reduction may go too far. In ordinary work the presence of soluble chlorides is the principal source of error. If for any reason the absence of chlorides cannot be ensured, the process should be carried out with a solution to which sufficient ammonia has been added to make it smell distinctly of that substance. The action will then be slow, but the character of the result will be the same and the risk of stains and irregularities much less. A few drops of ammonia may with advantage be added to the water used for the first two or three washings.

[Specimens were shown illustrating the effect of the persulphate on ordinary negatives. For instance, in the case of a whitewashed cottage with a grass lawn in front, considerable reduction can be effected in the sky, and the walls of the cottage, without any recognisable effect on the grass. In the case of a waterfall in a glen, the density of the water can be markedly reduced with only a slight effect on the much thinner deposits that represent the surrounding rocks.]

Persulphate can also be used with good effect in the case of lantern slides that are too opaque in the shadows. For this work it is not advisable to use a solution stronger than 2 parts in 100, or approximately 8 grains per oz. [Specimens of results were shown.]

C. H. BOTHAMLEY.

(To be continued.)

AXIAL ABERRATIONS OF LENSES.

[We are indebted to the Bureau of Standards of the United States Department of Commerce for the following paper, which deals with the chief axial aberrations of lenses and describes in detail the practical method worked out by the Bureau, based upon that of Hartmann for the measurement and plotting of the aberrations. In reproducing the text of the paper, exigencies of space have compelled the omission of one section, namely, that dealing mathematically with the sources of error. A brief abstract of this section is inserted in the text as printed, in its appropriate place. EDS. "B.J."]

(Continued from page 102.)

4. ZONAL VARIATION OF THE EQUIVALENT FOCAL LENGTH (E.F.L.) (SINE CONDITION).—Assume a lens LL_1 (Fig. 4) entirely corrected for spherical and chromatic aberrations. Then all zones will have the same axial focal point for all colours. If all the zones have not the same focal length, then the aberration called coma is present.

Let PQ (Fig. 4) be a small object perpendicular to the axis. Then PQ will be imaged in $P'Q'$ by the central zone of the lens LL_1. If the lens is free from spherical and chromatic aberrations, the point P will be focussed by the edge zone as well as by all other zones at P'; but if the E.F.L. (equivalent focal length) of the different zones be different, the edge zone will have a different magnification from the central zone; and the object PQ will be imaged in $P'Q'$ by the central zone, and in $P'Q''$ by the edge zone. In other words, the edge zone will focus the point Q in Q'' in the same plane, but in a different position from Q', the image by the central zone. If Q be a finite point, then Q' will be a very small disc of somewhat larger diameter than the disc produced at Q''. Hence the point Q will be imaged in a figure shaped like a comet, having a bright point at one end and trailing off in a broad fuzzy circle at the other. The sharp point will be directed toward or away from the axis depending on the relative sizes of the focal lengths for the edge and central zones.

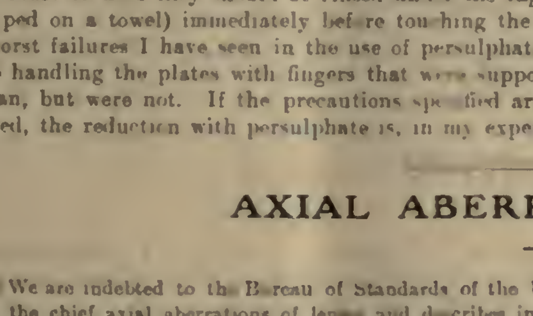

Fig. 4. Diagram illustrating image by lens free from spherical aberration, but having zonal variation of E. F. L.

The graphical representation of zonal variation of E.F.L. is shown in Fig. 2. Prolong the rays to P_1', P_2' P_3' and P_4' backward into the lens till they meet the rays P_1, Q_1, P_2, Q_2, P_3, Q_3, and P_4, Q_4 prolonged at K_1, K_2, K_3, and K_4 (K_1 is obtained by computing the axial focal length and measuring back from P_1'). The points K_1, K_2, K_3, and K_4 are the principal points for the corresponding zones, and the surface on which all these points lie is the principal surface of the lens.

Let h be the height at which the incident ray strikes the lens and u be the angle which the refracted ray makes with the axis. Then $\frac{h}{\sin u} = E$ is defined as the E.F.L. of the zone at a distance h from the axis.

In Fig. 2,

$$\frac{h_1}{\sin u_1} = K_1P_1'$$

$$\frac{h_2}{\sin u_2} = K_2P_2'$$

$$\frac{h_3}{\sin u_3} = K_3P_3'$$

$$\frac{h_4}{\sin u_4} = K_4P_4'$$

will be the equivalent focal lengths of the corresponding zones. If the lens is absolutely free from spherical aberration, then the condition

$$\frac{h}{\sin u} = \text{constant} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (a)$$

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[2] Distilled water, even in war time, is not expensive, and the cost of that required for washing a negative is far below the value of the negative to a professional photographer if it is worth his while to treat it with persulphate at all.

means also freedom from zonal variation of the E.F.L.; hence freedom from coma for points near the axis. Equation (*a*) is commonly known as the "Sine condition" for rays from an infinitely distant object. For artificially stopped systems and at large angles with the axis other additional terms have to be considered.[1]

In practice no lens is entirely corrected for spherical aberration. Some of the latter is left in to balance the higher order aberrations and to compromise for the best condition for the elimination of the other errors. In this case, as is shown below, the condition for freedom from coma is

$$\frac{h}{\sin u} - f = 0 \quad\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(b)$$

where f for the zone h is the distance from the axial principal point K_1, to the intersection of the ray from that zone with the axis. In Fig. 2—

$$f_1 = K_1P_1'$$
$$f_2 = K_1P_2'$$
$$f_3 = K_1P_3'$$
$$f_4 = K_1P_4'$$

Let $L\ L_1$ (Fig. 5) be a lens with spherical aberration present.

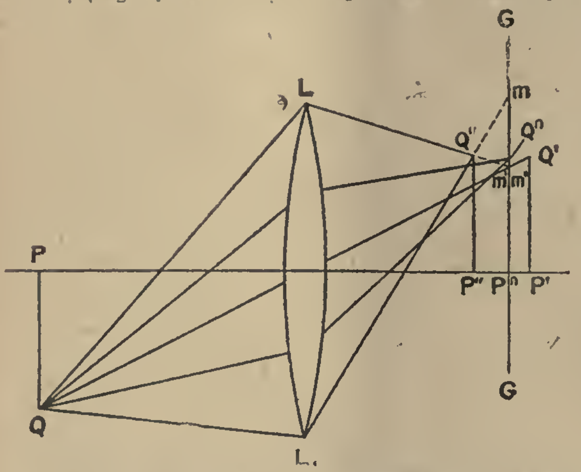

Fig. 5.—Diagram illustrating image by lens possessing spherical aberration, but free from zonal variations of E.F.L. (Condition $\frac{h}{\sin u}$ = const. fulfilled.)

Then the rays from the edge and centre will intersect the axis at P' and P'' respectively. Assuming

$$\frac{h}{\sin u} = \text{constant},$$

every zone will have the same magnifying power, and there will be a series of images of the object $P\ Q$ at all points from P' to P'', all of the same size. But the position of the plate will be the position of the average image somewhere between P' and P'', say, GG. The image at $P''Q''$ for the edge zone, when produced forward to the plate $G\ G$, will become a large disc in the position mm^1. The image for the central zone produced back to $G\ G$ will be a small disc at m''. At Q^n there will be a sharp image produced by some zone between the centre and the edge of the lens. Following the same procedure, the other zones will produce discs of diameter smaller than mm'. The figure on $G\ G$ will consist of a bright point at m'', trailing off into the broad fuzzy perimeter of the disc mm', giving the true shape of coma.

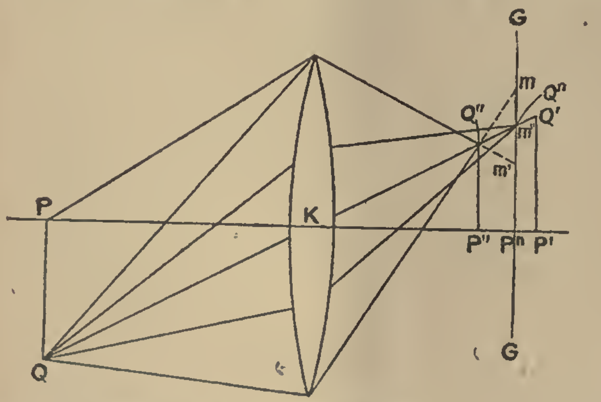

Fig. 6.—Diagram illustrating image by lens with condition $\left(\frac{h}{\sin u} - f = o\right)$ fulfilled.

In order to obtain a symmetrical image in a lens with spherical aberration present, the series of out-of-focus images in any position $G\ G$ (Fig. 6), formed by producing the rays of the various images Q' to Q'', must all be symmetrically placed with respect to the ray $K\ Q'$, through the central zone. In Fig. 6,

$$\frac{K\ P^n}{K\ P'} = \frac{P^n\ Q^n}{P'\ Q'},$$

but

$$\frac{P^n\ Q^n}{P'\ Q'} = \frac{\dfrac{h}{\sin u_n}}{\dfrac{h_1}{\sin u_1}} = \frac{E_n}{E'} = \frac{E_n}{E_{ax}}$$

and

$$KP' = F_{ax},\ KP^n = f_n$$

where the subscript "ax" refers to the axial zone.

Hence,

$$\frac{f_n}{f_{ax}} = \frac{E_n}{E_{ax}}$$

For the axial zone,

$$E_{ax} = f_{ax} = K_1\,P_1'.$$

Hence $E_n - f_n = 0$ is the condition for a symmetrical image free from comatic flare in a lens with spherical aberration present.

If we plot along the axis $P'\ Y$ (Fig. 2) the height h, and along $P'\ P$ the variation ΔE in the equivalent focal lengths of the zones from that of the central zone, we obtain the curve $P'\ S'$ representing the zonal variation of the E. F. L. If we represent the E. F. L. of the zone h by E_h and that of the axial zone by E_{ax}, then

$$\Delta E = E_h - E_{ax}$$

Similarly, if f_{ax} is the distance from the paraxial principal point to the paraxial focal point and f_h is the distance from the same principal point to the focal point for the zone h, then the spherical aberration $\Delta V = f_h - f_{ax}$.

When expressed in terms of the aberrations ΔE and ΔV, the condition $E_h - f_h$ becomes

$$E_h - f_h = (E_{ax} + \Delta E) - (f_{ax} + \Delta V) = \Delta E - \Delta V,$$

since $E_{ax} = f_{ax}$.

In Fig. 2 the full line represents ΔV and the dotted one is ΔE, hence the condition for freedom from coma for points near the axis, $\Delta E - \Delta V = 0$, means that the two curves coincide.

Variation of Sine Condition with Colour.—If the zonal variation of the E. F. L. be determined for different wave lengths, the curves may not coincide, showing a variation of ΔE with the colour. Since the size of the image depends on the E. F. L., the zonal variation of the E. F. L. with colour gives the variation of the size of the image with the colour, and hence the oblique chromatic aberration.

5. CURVATURE OF FIELD.—The preceding aberrations are the ones to be given most consideration when examining the central definition of a lens. When we depart somewhat from the centre of the field and go toward the edge, we find that the image of a plane object does not lie in a plane. If we plot the points of best focus, we find them forming a surface of a saucer-like shape. This defect is known as curvature of field.

6. ASTIGMATISM.—Toward the edge of the field we find that there may not be a position of good focus. The image may consist of a series of streaks running radially, and somewhere in a plane other than that of the radial image another series of streaks in a direction perpendicular to the first. This is due to the fact that a pencil of rays from a point striking the lens in one plane focusses at a point different from the focus of a pencil of rays from the same point, but in a plane perpendicular to that of the first pencil. This error is known as astigmatism, and is non-existent in the centre of the field of a lens with good surfacing and not strained in the mounting.

7. DISTORTION.—Another aberration which affects the image toward the edge of the field is distortion. This is the deformation of a straight line in the object into a curved line in the image, due to a variation of the angular magnifying power of a lens for rays incident at different angles.

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[1] The greatest effect on the definition is due to these seven errors, but there are certain unnamed aberrations, consisting of higher order terms, which affect the image to a smaller extent. Czapski gives twelve terms of the fifth order and twenty terms of the seventh order, besides the five terms of the third order.

Besides the preceding aberrations, we must take into account the so-called hybrid aberrations, or the effect of some of the previously mentioned errors on the others. These affect the definition at the edge of the field, and are exceedingly important in photographic lens systems where a large field is very desirable.

For the purpose of ascertaining the best use to which a lens of a given description may be put it is necessary to determine the magnitude of these aberrations, and the region of best correction. The significance of the axial aberrations from the point of view of general definition has been discussed in a previous paragraph. Hence the determination of these axial aberrations will give us a comparative value of the lens. To do this the method described below was devised.

Method.

The method used is an extension of Hartmann's method of objective testing[1]. His work is fully described in the "Zeitschrift fur Instrumentenkunde." Hartmann uses a screen to isolate rays along four diameters, 45° apart. He takes shadowgraphs at points very near the focus, and from these he obtains the spherical aberration and the astigmatism along the axis. For the zonal variation of the E. F. L. he places the lens with the mount in contact with a scale and measures the apparent length of the scale divisions through the lens with a micrometer. Hartmann's method has been applied to many large telescope objectives and small lenses. The method is tedious and complicated and requires two totally independent sets of measurements to obtain both the spherical aberration and the zonal variation of the E. F. L. Moreover, for comparatively thick lenses it is not possible to use the method for the zonal variation of the E. F. L. The extension described later gives both the errors with a single measurement, and can be used for all kinds of lenses of relatively large aperture and short focal length and for complete telescopic systems.

1. Description.—Fig. 7 is a diagrammatic sketch of the method. Parallel rays from a distant source fall on a metal screen S S pierced with small holes which isolate single rays. These rays are then refracted by the lens system under test, L L_1, and come to a focus at F, or near F, in the presence of spherical aberration. A photographic plate is placed in the position A and a shadow photograph taken. The plate is then moved to the position B on the other side of the focus and another shadow photograph taken. The shadow photographs have centre diffraction discs which can readily be measured if care is taken to choose a screen with holes of proper diameter and distance apart. If the plate is near the focus, as at B, sharp discs are obtained; at A, farther away from the focus, the discs are less sharp.

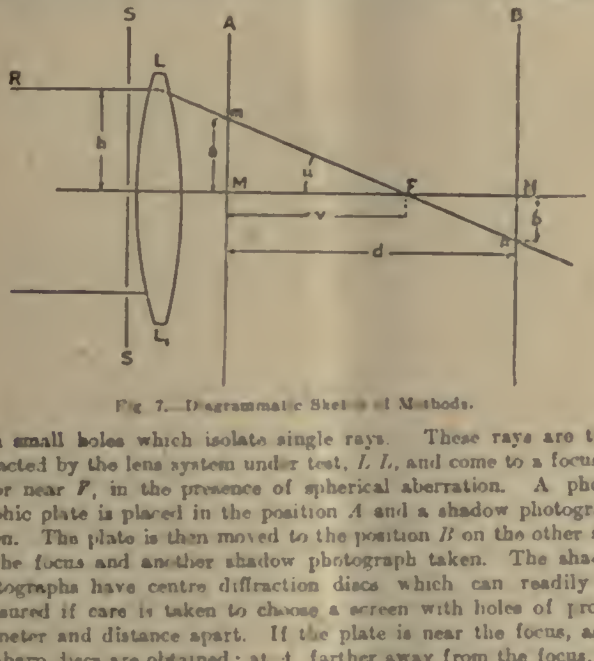

Fig. 7.—Diagrammatic Sketch of Methods.

Consider a ray, R (fig. 7), passing through the screen and striking the lens at a height, h, from the centre. It is refracted by the lens system making a disc on the plate A at m, and on the plate B at n. If M and N are the positions of the discs made by the ray through the centre of the lens, then a and b will be the distances from the centre of the plates A and B to the intersections of the ray R with the plates. The position F will be given by the expression $V = \frac{ad}{a+b}$ where V is the distance MF from the fixed point M, and d is the distance between the two positions of the plates. Assuming that Vo is the distance of the paraxial focal point from M, then the spherical aberration for the zone at a distance, h, from the lens axis is $\Delta Vh = Vh - Vo$.

In Fig. 7 u is the inclination of the refracted ray with the axis and

$$\tan u = \frac{a+b}{d}$$

from which $\sin u$ is easily determined. Hence, $\frac{h}{\sin u}$ for each zone can at once be determined if h is known. for this purpose the screen used was calibrated and the position of the holes was known to within 0.005 mm.

E. D. Tillyer.
H. I. Shultz.

(To be continued.)

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

The Influence of Good Negatives.

It is generally understood that the quality of a print depends upon the materials used in its production and the workmanship employed, but before tank development and bromide paper were so popular the quality of the negative was considered of primary importance.

The easing of plate development by the introduction of the tank and the versatility of bromide and other development papers have brought about a tendency to consider negative making as of less importance than it used to be. Compared with old methods it is very easy to tank a batch of Rembrandts, or a batch of white backgrounds, or a batch of copies with the confidence of producing twelve decent negatives out of every dozen without any very special care, but, alas! it is just a trifle easier to let the three varieties get mixed, to make up the solution without regard for accurate strength, and to judge the temperature with a finger or not at all. If the consequent negatives are dense or thin, harsh or flat, there is a fatal temptation to remember that bromide paper will cover the fault. A competent bromide printèr can certainly make passable prints off almost any negative, but at the same time an apprentice can make better prints from a *perfect* negative, than the cleverest man can from an impossible one, and in much less time.

Some years ago I was asked to undertake the development of a large quantity of exposed plates, most of them large-sized life studies, some direct and some copied. It was impressed on me that the negatives must be *fool proof*. Very large numbers of bromide prints were to be made from them by junior labour, in the shape of girl assistants who could "print" in the barest sense of the word only. A quantity of the pictures were of the white background variety, and I was told that no negative was to need vignetting, dodging, over- or under-exposing to give a good print, and that they were to be of a density which would not necessitate extreme exposures or changing of lamps.

The production of those negatives entailed some care, but I am convinced that the trouble was not wasted, for had they been done in a slipshod manner an expert would have been necessary to print them and a greater amount of waste would have been incurred, for (and this is the point of the argument) though the right man can make good prints from all sorts of negatives, he cannot do it without an amount of "messing about" that may come expensive in the end. This covering up of poor negatives not only causes needless waste, it has its bad effect on the printer. The forced prodigality with paper, developer, and light induces extravagance in the most economical workers, while the thought that his careful work is encouraging the scamping of the plate development is likely to turn a conscientious printer into a "don't care."

On the other hand, perfect negatives encourage good work and economy, for with them it is not necessary to spend time dodging and faking or to use paper in numerous tests or to oxidise pints of developer in "forcing." There is, of course, a question as to what constitutes a perfect negative, and it is only likely that opinions differ on the point, but from a printing point of view a perfect negative is the kind of negative that can be found among the old boxes of almost any first or middle class firm, a negative that can be printed in platinum or P.O.P., and at the same time will give a good print on *any* good make of bromide. This latter is an important point, for many poor negatives will print on some particular brand of paper easily, owing to a peculiarity of the paper. The perfect printing negative does not require any special make or any special genius to give a good print, and such a negative can be produced without any special talent or trouble if the important details of tank development are not neglected. I am, of course, taking it for granted that the subject *and the background* are correctly lighted, for, if not, that omission alone may spoil the negative for the printer.—Thermit.

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[1] Objectivuntersuchungen., Zeitschrift fur Instrumentenkunde, 24, pp. 1, 33, 97; 1904

Exhibitions

IMPERIAL WAR PHOTOGRAPHS IN COLOUR.

A most interesting and important exhibition of official war photographs was opened at the Grafton Galleries on Monday, March 4, the exhibits being noteworthy for the fact that they are nearly all tinted in colour, while all are very large scale enlargements. The big scale and the colour combine to make this the most realistic collection of war pictures that we have seen. The figures in some cases are not far short of life-size, and the spectator is brought into such close proximity with the subjects that, without much effort, he can feel himself to be part of the scene. The process used seems to be sepia toning, followed by the aerograph, and the user of the aerograph, whoever he may be, is much to be congratulated on the skill with which he has used it, and the knowledge of colour he has displayed. In many instances, also, the photographer has shown a most happy choice of view point, and remarkable ability in "pressing the button" at exactly the right moment. As regards scale, the most notable achievement is the photograph catalogued as No. 2, and entitled "Dreadnoughts of the Battlefield." Naturally this refers to tanks, which, skilfully camouflaged, are seen crawling up to the attack in one of the recent advances. This picture measures 22 ft. by 13 ft. 6 in., and, we understand, was enlarged from a 5 x 4 negative. This means an enlargement of at least 53 diameters. Another picture (54), "Where is the Pessimist?" represents a great effort on the part of the enlarger. This is a very long frieze panel picture of a line of troops on the march, and is described aptly as "The great puzzle picture, to which the spectator cannot find a solution." Space will not allow us to make special reference to more than a few of the 150 pictures on view, which cover nearly every phase of life on active service, and also various battlefields in France, Palestine, and Mesopotamia. Some of the Eastern pictures are of remarkable interest, notably "General Allenby Entering Jerusalem" (30), "The Reading of the Proclamation at Jerusalem" (83), "The Entry into Bagdad" (81). These are, or will be, of historic value, but there are others also worth special attention as pictures, notably, "The Long, Long Trail" (74), showing a march through the desert, through visible flying dust and sand, and obvious intense heat. Another impressive picture, "They also Died for England" (75), shows a long line of dead animals in the desert, marking a line of march. A great scene of energy and movement is depicted in "In the Wake of the Retreating Turk" (32), where our men are seen dragging an enormous gun through the narrow, winding streets of Bagdad. Among the general subjects, a fine figure study is "After the Scrap" (42), where a finely-set-up "Tommy" is seen returning from the fighting line with what Mulvaney called "the fog of fighting" still on him, a well-pleased, rather damaged conqueror, in a highly dangerous mood for any Hun who may yet get in his way. The damage of war is illustrated in startling fashion in "All that Remains of the Beautiful Château of Caulincourt" (41). This is nothing but an incredible heap of small fragments of rubbish. A very happy example of successful photography and colouring is "Come on in, the Water's Fine" (45). Naturally, this is a bathing scene, but in it the combined efforts of all responsible have produced a most excellent result. The subjects are so numerous that there is interest for everyone. From a German trench through which the British have just gone with their bayonets we can pass to a view of Tommy showing a small French girl a photograph of his own little girl at home. We can view close at hand many notable people who have visited the Front. We can study Tommy, from the mood in which he acts "Cinderella" to that in which he meets the Bosche. We even meet with the somewhat unexpected vision of a Zulu chief in full native undress, in conversation with Staff officers, somewhere in France! The subjects are, in fact, almost as numerous as the pictures, and the exhibition is one that should on no account be missed. Certainly not by photographers, who will see many things that make them feel proud of their craft, and still prouder of their fellows who have produced such fine results, under, in many cases, most extraordinarily trying conditions. All profits on the exhibition will be devoted to war charities, and the pictures will, no doubt, tour the country at a later date. America is one place for which they are destined, while similar series will be sent to France. We understand that the photographers responsible for these photographs are Lieutenants Brooks and Brook, of the British Army, while the organisation of the exhibition was put in the hands of the Canadian War Records Office, which was responsible for the two previous Canadian exhibitions held in the same galleries.

FORTHCOMING EXHIBITIONS.

March 12 to 15.—Hackney Photographic Society. Sec., Walter Selfe, 24, Pembury Road, Clapton, E.5.

April 18 to May.—Hampshire House, Hammersmith, Photographic Society. Entries close March 19. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, March 9.

Stalybridge Photographic and Scientific Society. "Trimming and Mounting." W. Harwood.

Monday, March 11.

Dawsbory Photographic Society. "Hints and Dodges." N. Ruddlesden.
Keighley and District Photographic Association. "Gum-Bichromate Process." J. H. Leighton.
Bradford Photographic Society. In Cromwell's Land." F. Thorne.

Tuesday, March 12.

Royal Photographic Society. "A Convenient Accurate Photometer for the Measurement of Photographic Densities." D. E. Benson, W. B. Ferguson, and F. F. Renwick.
Birmingham Photographic Society. "The Wonderland of the Wasps." J. J. Ward. F.E.S.
Hanley Photographic Society, Y.M.C.A. Members' Night. J. R. Cox.
Stalybridge Photographic and Scientific Society. "Colour Photography" (Paget Process). R. H. Beavan.
Manchester Amateur Photographic Society. Social Evening.

Wednesday, March 13.

Photo-Micrographic Society. "Some Disease-Producing Protozoa." Professor R. T. Hewlett.
Bristol Photographic Club. Members' Lantern Slide Evening.
Ilford Photographic Society. "All Home Made" N. K. Jackson.

Thursday, March 14.

Hull Photographic Society. "Amateur Photographer." Prize Slides.
Stockport Photographic Society. "Lantern Slide Making and Toning Bromides." J. J. Rothwall.
Liverpool Amateur Photographic Association. "Child Life in Japan." Dr. W. M. Cairns.
Hammersmith (Hampshire House) Photographic Society. "Among the Foothills of the Eastern Alps." J. D. Johnston.
Rodlay and District Photographic Society. Y.P.U. Portfolio.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, March 5, the vice-president, Mr. F. F. Renwick, in the chair.

Captain G. E. Allen, of the Royal Flying Corps, delivered a lecture on "Cairo," illustrated by a large number of lantern slides showing the exterior and interior of innumerable mosques. He took his audience through the narrow streets of Cairo, with its gates, arches, and minarets, out to the Pyramids. He concluded with some views of Alexandria, showing it to be very much like a modern Italian town.

On the proposition of the chairman, a hearty vote of thanks was accorded to the lecturer.

CROYDON CAMERA CLUB.

Mr. F. Ackroyd gave a lantern-lecture on "Travellers' Samples, gathered with motor and camera," which covered a wide ground, with casual themes gathered by the roadside. That they had no connecting link did not detract from the interest of the lecture, for he is a close observer with a catholic knowledge which enables him to deal with varied topics in instructive and dryly humorous fashion. Nearly all the views included his motor car, a fact which often secured acceptance of prints by journals devoted to motoring, though the subjects depicted had not the remotest connection with it. Evidently Mr. Ackroyd is possessed of the journalistic instinct.

Prior to the lecture he occupied an unchallenged position in the club as the maker of lantern-slides, which, technically, might be described as triumphantly execrable, and far from assertive in a pictorial aspect. Now he appears to be in a transition stage, for many of the slides shown were really good, some fair, and the rest reminiscent of the past. In the discussion Mr. Salt was anxious to learn how the special "mildewed whitewash" effects were secured.

Mr. Ackroyd did not throw much light on the mystery, but said he quite understood the want of appreciation expressed, for his main object was to appeal to the brain and not to the eye. The president (Mr. A. F. Catharine), in proposing a vote of thanks for an excellent and entertaining evening, said he felt sure if any were to see Naples for the first time through the medium of Mr. Ackroyd's normal lantern-slides, they not only would be willing to die, but actually desirous of expiring, in confirmation of the well-known adage. The president is the last one to gush, so no doubt could arise as to the sincerity of the compliment, which was feelingly acknowledged by the lecturer.

Throughout the evening the lantern illuminant—an open arc run on alternating current—behaved like a soda-water syphon in distress, varied with the "in and out" business. The old stock of carbons was exhausted, and new ones were given their first trial. At all times an open arc on alternating supply is a bit of a beast, and with frolicsome carbons turns into a veritable Hun. Certainly our old friend the limelight has much to recommend it, and many think for projection on a moderate scale it has never been beaten for exhibiting slides to the best advantage. Later on the half-watt metallic filament lamp will compete for favour.

The South London Photographic Society.—At the fortnightly meeting of this society, on Monday evening, March 4, a paper of considerable interest to professional photographers was read by Mr. Drinkwater Butt, F.R.P.S., on the subject of "The Photographic Studio and Premises." The lecturer made some preliminary remarks on the necessity for photographers, in common with other professional and commercial men, commencing now to prepare for "after the war" conditions, by improving their premises as far as possible and doing everything in their power to facilitate the conduct of their businesses, not only with greater economy and efficiency, but also with increased attention to the artistic quality of the surroundings with which such businesses should be, but too often are not, associated. Mr. Butt then proceeded to consider the design and decoration of photographic premises generally.

A beginning was made with the shop window, that being the photographer's first and most important means of bringing his work to the notice of possible clients. The advantages of the small window, as being easier of arrangement, more economical of specimens, and more conducive to their artistic display, were discussed.

The various methods of the design and decoration of the windows themselves were then gone into, and a number of slides of some existing windows, including those designed by Mr. George Walton for the Regent Street branch of the Kodak Company, and others designed by Mr. Butt himself for Mr. Keith Dannatt at Woking, Mr. Swaine at Southsea, etc., were shown.

In dealing with the arrangement, decoration and furnishing of the reception room, the lecturer showed an original design for an apartment of this kind.

Passing next to the subject of the studio, a short historical sketch was given of this, the most important development of the photographer's premises. This was illustrated by slides of a diagrammatic nature of the studios of Monckhoven, Stuart Wortley, T. R. Williams, Rejlander, and Valentine Blanchard, with descriptions of each. Points relating to the design of modern studios, such as aspect, area, orientation, length, width, height, étc., were considered, followed by discussion of the merits of the various forms of section, including the lean-to, ridge form, and single slant studios, with reference to the lightings, etc., to be obtained therein.

The lecturer concluded with the exhibition of slides and the giving of a full description of an ideal set of photographic premises suitable for erection on a town site and for the carrying on of a general high-class photographic business. The usual votes of thanks were tendered to Mr. Butt for a lecture which was evidently listened to with much appreciation and interest.

Commercial & Legal Intelligence.

At the London Bankruptcy Court, on Thursday in last week, before Mr. W. P. Bowyer, official receiver, the first meeting of creditors was held under the failure of Henry Arthur Yoerg Heathcote, photographer, 22, St. James Street, Piccadilly, W. The debtor had recently held a commission in the R.N.V.R., but was invalided out in 1915. He then raised £2,000 on a reversionary interest, and commenced business as a photographer at 22, St. James Street. The initial expenses of starting the business were very heavy, and subsequently he found himself short of capital. In August last he incurred a heavy loss, whereupon he closed the business, and has since been without occupation. His liabilities were between £500 and £700, and his principal asset was his reversionary interest, which was charged, but should produce more than sufficient to pay his creditors in full. He did not admit insolvency.

It was decided to appoint Mr. Henry Fraser, of 2, Guildhall Chambers, E.C., as trustee of the estate, to act under the supervision of a committee of inspection.

News and Notes.

Photomicrographic Society.—The next ordinary meeting of the Photomicrographic Society will be held on Wednesday, March 13, at 7 p.m., at King's College Bacteriological Laboratories, 62, Chandos Street, Charing Cross, W.C., when Professor R. T. Hewlett will lecture on "Some Disease-producing Protozoa." Visitors are invited, and cards of invitation may be obtained of the hon. secretary, Mr. J. G. Bradbury, 1, Hogarth Hill, Finchley Road, Hendon, N.W.4.

British-made Process Engravers' Glue.—On account of the scarcity and high price of American fish glue, endeavours have been made to provide an efficient British substitute. Messrs. Penrose are now offering to the trade their "Chanticleer" process glue as a thoroughly reliable article, and equal to the American product. Another point in its favour is that whilst American glue has always been put up in American pints and quarts, the "Chanticleer" process glue is put up in standard British pints and quarts, yielding one-fifth larger quantity. Leaflets of instruction for use will be sent on application to Messrs. A. W. Penrose and Co., Limited, 109, Farringdon Road, London, E.C.

The Industrial Reconstruction Council.—The Industrial Reconstruction Council is holding a meeting at the Town Hall, Manchester, on Wednesday, March 13, at 3 p.m., under the auspices of the Lord Mayor. Mr. G. H. Roberts, Minister of Labour, and Sir William McCormick, Department of Scientific and Industrial Research, will be the leading speakers. This is the first of a series of public towns meetings in all the great industrial centres of the country, arranged by the Industrial Reconstruction Council with the object of awakening national interest in the vital industrial problems of the immediate future. Applications for tickets should be made to the secretary, the Industrial Reconstruction Council, 8, Bouverie Street, London, E.C.4.

British Industries Fair, 1918.—The fourth British Industries Fair, organised by the Board of Trade since the outbreak of war, will be opened in the Pennington Street premises of the London Dock on Monday next. The building in which the fair will be held this year is situated within twelve minutes walk of Mark Lane Station on the Underground Railway, and a service of motor omnibuses will ply between Mark Lane Station and the fair. In order to avoid any possible interference with the production of military requirements, the fair has again been confined to the following industries—viz., pottery, glass, stationery, paper, printing, fancy goods, and toys. Admission to the fair is again confined to *bonâ fide* trade buyers, and invitations have been issued by the Board of Trade direct to over 60,000 firms in this country. Any firms which have not yet received an invitation, and desire to visit the fair, should apply for a card of admission to the Director, British Industries Fair, Board of Trade, 10, Basinghall Street, E.C.2.

PHOTOGRAPHIC RECORD AND SURVEY OF NOTTINGHAM.—Further interesting photographs and illustrations have been presented to the Public Libraries to assist in the scheme of formation of a local pictorial record and survey, for which purpose gifts of photographs are being invited. Mr. H. Gill, F.S.A., has given 36 local photographs, including a series of illustrations of churches in the county, old houses, and objects of local interest, impressions of church brasses, etc. Photographs of Collin's Almshouses, Colwick Hall, and Linby Cross are among the prints given. A series of local architectural drawings, presented by Mr. Gill, are useful additions to the collection. Other contributors include Mr. F. W. Dobson, who has given a print of Old Brewhouse Yard from the negative in his possession; and Mr. James Ward has presented a photograph of old St. Peter's Gate, showing the old horse trams. Mr. A. Lineker, of Bromley House, has given a set of photographs, including the Market Place, the Mayoral opening of Bulwell Hall Park, Southwell, Broxtowe Hall, and the Midland Railway Station in course of erection. Various other photographs have been promised. Some of the photographs are on view in the Reference Library.

MIDLAND RAILWAY INSTITUTE PHOTOGRAPHIC SOCIETY, DERBY.—In presenting his report at the annual general meeting held on Monday, March 4, the secretary said it was advisable to continue to have technical lectures from time to time, so that young or inexperienced members may have an opportunity of stating their difficulties and of benefiting by the experience of experts in various branches of the art. The next generation is growing up all the time, and the fascinating hobby of photography, with the appeal to the artistic faculties for some, its alluring ramifications into chemistry and physics for others, and its usefulness for stimulating social intercourse, naturally and inevitably attracts every year its new quota of neophytes and devotees, who require helping and encouraging. The society occupies a strong position even amidst the difficulties of this prolonged war-time. The well-equipped dark room has been in regular use, by one member or another, throughout the year. Old membership has been fully maintained, and fourteen new members have been enrolled since the last annual meeting. There are 120 subscription members, and, in addition, about fifty honorary members who are away on war work of one kind or another. Mr. William Smithard, who has held the position of hon. secretary since the society was formed seven years ago, is retiring, and Mr. C. G. Thorpe, of the Advertising Office, Midland Railway, has accepted the committee's invitation to take over the hon. secretaryship in succession to Mr. Smithard.

TRIBUNAL APPEAL.—At the Oxford Appeal Tribunal the National Service representative asked for the withdrawal of the certificate granted to Arthur P. Manners (38), married, B1, 247, Iffley Road, chemical and photographic dealer's manager. He was granted temporary exemption for three months by the Oxford Local Tribunal on January 31, the convincing reasons that influenced them being that Mr. Manners' employer, although above military age, had voluntarily enlisted in order to undertake photographic work of a special character required by the military authorities, and was still in the Army performing this work. Mr. Manners was left in charge of Mr. Rose's business at Oxford, and was himself doing valuable work for the military hospitals.

Mr. Andrew Walsh appeared for Mr. Will R. Rose, who said he traded at Chester and Oxford. Mr. Manners was the manager of the Oxford business, which was opened ten years ago. He was the only man employed in the Oxford business. There were thirty-one girls and two boys. The whole business was under the entire supervision of Mr. Manners, and required a considerable knowledge of chemistry. There was no one in the place who could supply his place. His brother was the only man in the Chester business, and there were upwards of 100 girls. He (Mr. Rose) was 46 years of age, and joined the Royal Flying Corps early in 1915, by request, to help with the aerial photography. He served one year with the Flying Corps and then transferred to the Navy. He was the Officer Commanding a photographic aerodrome on the East Coast; personally he was frequently flying, and was doing very important work. If he were not in the Navy Mr. Manners could be released. Mr. Manners did all the special medical work.

By Captain Sheild: The business, he admitted, was not of national importance, but it was essential to him.

Your application is on the ground of serious hardship to yourself?—Just that.

Which is no ground for exemption. Perhaps you don't know that?—No.

What is there to prevent a woman being taken on to do the mixing of chemicals?—None. I believe a woman could do it.

The Chairman said he regretted to tell Mr. Rose the Tribunal could not agree with the Local Tribunal that the claim made by him for Mr. Manners justified the exemption that had been granted. They had to look at the national importance of the business claim, and they could not find in this case sufficient to justify exemption. They appreciated Mr. Rose's services to the country, but they could not allow those services to entitle the claim for exemption which was not supported on other grounds of national importance, but they would allow the fullest time they were accustomed to give—two months—and at the end of that time Mr. Manners would have to be available for service.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

⁂ *We do not undertake responsibility for the opinions expressed by our correspondents.*

SHARP ENLARGEMENTS.

To the Editors.

Gentlemen,—Adverting to the paragraph on page 86 of the "Journal," it does not appear to be generally known that a good focussing magnifier, adjusted to the user's eye and fixed in a hole cut at the centre of the enlarging easel, with the front surface of the magnifier in the same plane as the front of the easel, enables sharp enlargements to be made quite easily.

The enlargement is first roughly focussed to size on the front of the easel, and the final adjustment is then made by slightly moving the easel to and fro whilst the eye is applied to the magnifier. When the definition is perfect the grain of the negative will be seen through the magnifier.—Faithfully yours,

CLEMENT J. LEAPER.

Galway, February 26, 1918.

HYPO RECOVERY.

To the Editors.

Gentlemen,—Mr. S. F. E. Johnson's experiment is interesting, but I fear he has overlooked a rather important point. A result similar to his is quite easily obtained by adding ammonia only to the used fixing bath, and without resorting to the precipitation of the sulphide at all. I think if he goes into the matter again he will find that instead of recovering or restoring the hypo he has simply converted the unused hypo left in the original bath into the much quicker-acting ammonium compound, which, experience seems to show, is not a very reliable fixing agent.

I have just completed a long series of experiments on this subject, all of which tend to show that the hypo actually employed in the fixing process is irrecoverable by any simple means, simply because it no longer exists in its original form, but has assumed that of a different compound altogether. The results are now being put together for publication, and I hope to have all completed very shortly.—Yours faithfully,

March 2, 1918. C. WELBORNE PIPER.

PLATE SIZES.

To the Editors.

Gentlemen,—For landscape work 7½ x 5 is no doubt the best size and shape for serious amateurs, but they are not very numerous. For some time before the war even ½-plate cameras were going cheap, because the average amateur wanted something smaller, and the demand for anything bigger than postcard is not likely to be revived after the war. It is a pity our manufacturers did not adopt either 6 x 4 or the Continental equivalent—15 x 10 cm.—as the standard plate for postcard views.

For professional use 7½ x 5 is less useful than 1/1, and I question whether Kodak Co. will "strike ile" with their 11 x 7. 11 x 8 would have stood a chance, as though 10 x 8 has not been very largely used in England, it is a useful size, and what 10 x 8 cameras there are about are, judging by the advertisements, being used up, and the extra 1 in. in new cameras would have been no disadvantage for groups.—Yours truly, W. Coles.

DEVELOPER POISONING.

To the Editors.

Gentlemen,—In reply to Mr. C. M. Foster, may I respectfully point out that I imagine nothing—I never do, and never intend to do, neither has it passed through my imaginative (in his opinion) mind that he was of a bloodthirsty nature, although he may be a sportsman.

Now, Mr. Foster even goes so far as to compare the *source* of his information with *myself* as being a member of the Pharmaceutical Society. Please don't do this; I may be thick-skinned, but I hardly take this in, for I am sure no chemist would write such a ludicrous recipe. Mr. Foster is not content with giving a recipe which is totally inaccurate as published in the "British Pharmaceutical Codex," but now states it may not be the one in the "British Pharmacopœia"! Will Mr. Foster take it from me, without argument, that Ung. Methyl Salicyl Co. is not published in the present edition of the "British Pharmacopœia," nor has it ever been in former ones? James Dunning.

Ventnor, February 28, 1918.

[The point at issue really is that Mr. Foster discovered a prescription which, whether right or wrong, cured *him*, and in all good faith offered it to others afflicted as he was. As we have so often pointed out when dealing with this question, a remedy that will cure one will not touch another. So far as we are concerned, the matter is now ended.—Eds. "B.J."]

◆

Exhibition of Samples of German and Austrian Goods.—At the invitation of Sir William Clark, of the Commercial Intelligence Department, Board of Trade, representatives of trade and technical journals attended at 73, Basinghall Street, E.C., on March 4, to view the exhibition of samples now on view. Sir William, in a short speech, explained the objects of the exhibition, and drew attention to the success with which the scheme had met up to the present, hundreds of British firms having already studied the samples most carefully during 1917 alone. In the provinces 15,000 manufacturers and merchants have examined them up to the present, while 1,236 samples have been lent for copying purposes. The exhibition is arranged to show the quality, design, and style of goods in popular demand in various parts of the world, and the prices, discounts, and terms of credit allowed by the German manufacturers. The Department can supply merchants with the names of British manufacturers supplying similar goods, and manufacturers with the names of overseas buyers. Further, they are prepared to lend samples to any firms desirous of copying them, and to give details concerning tariffs, freights, commercial customs, etc, to any firms desiring new foreign markets. The exhibition includes about 15,000 samples in a great variety of trades, and about 1,000 of the samples are new, having only been manufactured since the war began. We could, however, find only one solitary photographic exhibit, in the shape of a folding camera of ordinary type. The quality varies from the cheapest possible rubbish, designed for selling to natives, up to goods of fair quality, but there is not much of the highest quality enemy work in evidence. The exhibition is an excellent thing for the trades that it includes, and we should like to see the idea extended to cover the numerous photographic manufactures with which photographers have been so bountifully supplied in the past.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

Arc Lamp Glasses.—Can you inform me how to prevent the inside of the cylinder of enclosed arc from quickly becoming coated with white deposit?—J.

Your cylinder does not fit closely enough to the top and bottom plates, or perhaps you have a small piece chipped out of the edge.

Embossing Postcard Borders.—Could you inform me where I could obtain a machine for embossing the floral borders on postcards same as enclosed card?—J. S.

The necessary brass blocks can be obtained from Messrs. Knights and Cottrell, 6, Tudor Street, E.C. Presses from Messrs. Hughes and Kimber, 9, Gough Square, or other large printers' engineers.

Emulsion for Extreme Contrasts.—We fear we cannot help you very much, but consider that the effects you want should be best secured with a slow, fine-grain, richly-coated emulsion, containing iodide. We do not know of any special ingredients that will help the effect, and believe it to be a fact that much more depends on the skill and experience of the emulsion maker than upon the formula used.

Celluloid, etc.—(1) The only photographic use for the celluloid would be to make carbon miniatures upon for colouring; the surface would want finishing with fine pumice. (2) The red colour has faded out. Nearly all reds and pinks are fugitive, and carmine and crimson lake are the worst. Rose madder is the most permanent pink. Be very careful only to use the best colours. Most "students'" colours fade.

Value of Lens.—Your description of the lens is altogether too vague for us to identify. It may be a rapid rectilinear, a wide-angle, or a Holostigmat, and in such case the value and capabilities would differ widely. The number you quote is only a serial number, and does not give us any information. If you care to send us the lens, with stamps for return postage, we should be pleased to give you some idea of its capabilities.

Groups and Full-lengths.—Will you let me know the best kind of a lens to get for taking full-lengths and groups in a studio which is 16 ft. long? I want one with good definition and very quick acting.—C. B.

You will do best with an anastigmat of not more than 8 in. focal length and an aperture of *f*/4.5. This will cover the half-plate well at full aperture. You should not attempt large heads with this, but up to, say, 1½ in. there should be no apparent distortion.

Test for Residue.—If it is sulphide of silver, it will be a black compound, and will be soluble in warm dilute nitric acid (about 1 to 3 of water). If you take a little of the solution, dilute it, then add a strong solution of salt, white silver chloride will come down. This you can identify easily, for it will be soluble in ammonia, and will be precipitated again for the solution by adding a few drops of sulphuric acid. For the test you need only take a very minute portion of the sludge, and if it proves to be silver you can then collect the lot and send it to the refiners. You should also test the liquor in the barrel by taking out a little and adding to it a drop of sulphide solution. A black precipitate will show that all the silver has not yet been thrown down.

Supplementary Lens.—Please tell me if it is possible to use a supplementary lens to halve the focus—viz., to make an eight-inch $f/8$ lens into a four-inch $f/4$? If so, what supplementary lens shall I require, and where can I get it?—E. G. A. P.

Yes, you will require another eight-inch lens. The only commercial article is the copying planiscope, sold by Griffins, Kingsway. Or you might get an eight-inch single landscape lens and fit it yourself.

Pyro Developer.—Can you say what becomes of the pyro in ordinary P.S. or P. ammonia development? What does it decompose into, and can you refer to any published statement? Have looked at Fownes and Roscoe and Schorlmer, but they don't touch it, and I have no other handy. I may have one of Abney's, but can't put my hand on it.—"Pyro."

The pyro is oxidised, but nothing is known with regard to the exact composition of the oxidation product.

Portrait Lens.—The lens appears to be a cabinet portrait lens of about 10 in. focal length with an aperture of $f/4$. These usually require stopping down considerably to cover the standing figure, as there is considerable curvature of field. You could use the front lens alone for large heads. It will probably have a focal length of about 14 in., and would give sufficient sharpness at an actual aperture of about $F/10$ (not $f/10$ of the complete lens). You must judge the instrument on its merits. Do not buy unless you are satisfied; its value is probably £3 to £4.

Studio.—1. The precise tint of the studio walls is of little moment; it is rather a question of their reflecting power. For a well-lighted studio we think that light grey or cream is rather apt to give a flat lighting; we should prefer a greenish grey. If your light is at all obstructed, light walls will be an advantage. 2. A good distemper is quite suitable. 3. To take seven full-length figures the oblong way of a half-plate you will have to use an 8½ in. lens. If you can use the plate upright, a 10 in. lens will do. 4. No, so long as they are placed so as not to throw strong reflected lights on the sitter.

Damp Cabinet.—I have a cabinet in my reception room in which I have been keeping leather wallets and miniature cases. I find they are all going spotty with mildew, owing, evidently, to damp or mildew germs in the cabinet. Can you advise me what to do to make the cabinet safe for such goods?

Keep a lump of quicklime or a little chloride of calcium in an ornamental vessel, not covered, in the cupboard. This will keep the air dry. When the lime falls to powder renew it, or if you use calcium chloride dry it in an old pan over a good fire. Do not leave the cabinet open longer than you can help.

Studio.—We wish to fit up a room 14 feet by 15 as a studio, and have in use a 7½-inch lens working at 5.4, and a Ross Telecentric 13-inch 5.4. We do not intend using anything larger than ½-plates, and should like to use half-watt portrait lamps. The room is only 9 feet high, and is the only one we can spare for the purpose. Will you kindly help us as to colour of walls, power, and position of lamps to get fully-exposed negatives with Wellington anti-screen plates in half a second to one second?—G. G. B.

You will require four or five 1,000 c.p. lamps, arranged as given in our article of October 26, 1917. The walls must be of a light grey if you wish to give such short exposures.

Blue Spots on Prints.—I am sending along for your inspection and advice several prints showing a bluish stain. These stains, we think, are caused in the hypo fixing bath; the hypo used is some we bought a short time ago and paid 60s. per cwt. for. I am sending you a sample of the hypo, and shall be glad if you could tell me if this is faulty. I made a further batch of prints, using a different make of hypo, and these turned out all right. This is what makes me think that hypo is the cause.—H. D.

The hypo does not appear to be in fault, although it is rather a dirty sample. We should advise you to strain it before use, as the black particles may scratch the surface. We cannot identify the staining material. It is not violet dye, nor does it appear to be metallic. From tests we made, it appears more like a vegetable dye, which has been splashed on either in the washing or fixing.

Studio Lighting.—In your almanac, just published, for 1918 there is a description for lighting a studio with two half-watt lamps of 2,000 candle-power, each fitted on a telescopic stand, the lamps 6 inches from each other, and a white blind as a reflector. I am wanting to light a small studio about 12 x 8, but require the light for both *heads* and small groups of, say, three or four persons, sometimes. Which would be the better arrangement for me? (1) The two lamps on *two* separate stands, with loose flex to give more diffused lighting rather than the two together; or (2) 4 carbon north light or 5 carbon tress; or (3) a Jandus or Westminster arc lamp; and would one be sufficient? Also say what height from floor to light is necessary, as studio is not very high. With a 3D Dallmeyer, working at F. 6, what exposure would be necessary with a plate working, say, 300 H. and D.?—Bert.

We think the best arrangement will be to have the standard you first mention, with a longer arm, so that you can separate the two lamps to, say, 18 in. distance. You will find two standards in the way in so narrow a studio. The exposure would be about 3 or 4 seconds. Much depends on the distance between lamp and sitter. Next to this we would recommend the enclosed arc. In any case, the light should be capable of being raised to 8 ft. from the floor for full-lengths and groups. The Kodak "Toplight" arc is good for this; the Jandus and ordinary Westminster type require more head room The half-watts may be arranged quite close to the ceiling.

◆

New Military Prohibition of Photography.—Orders have been made by the competent military authorities, under the Defence of the Realm Regulations, prohibiting the making, after next Monday, of any photograph, sketch, plan, model "or other representation of any place or thing" within the area mentioned. No person in this area shall, without lawful authority or excuse, have in his possession any photographic or other apparatus, "or other material, or thing suitable for use in making any such representation." Nothing in the Order is to be construed as prohibiting the making of a photograph, sketch, plan, model, or other representation in any photographic or other studio, or a private dwelling-house, or the garden or other premises attached thereto, of any person or things therein, or as prohibiting the possession of photographic or other apparatus, materials, or things intended solely for use in such studio, dwelling-house, or other premises. The area affected consists of certain places in the Metropolitan Police District and certain areas in the counties of Essex, Kent, and Surrey.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as "returns" are no longer accepted by the publishers. This step has become necessary owing to the further restrictions imposed by the Government on the importation of paper and paper-making materials and of the consequent shortage of supplies. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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SUMMARY.

The further instalment of the Traill Taylor Lecture by Mr. C. H. Bothamley deals with the chromium intensifier, for which Mr. Bothamley offered several alternative formulæ. One of these differs simply in making use of hydrochloric acid of 10 per cent. strength instead of the strong acid, thus making it easier for the reducer to be more correctly compounded as regards the (important) proportion of acid. A second formula consists of a mixture of chromic acid and salt, and was found to give a degree of intensification corresponding with the A chromium formula as printed in the "Almanac." (P. 123.)

The concluding portion of the paper on the axial aberrations of lenses consists for the most part of curves showing the results obtained by the application of a modified Hartmann method. As we point out in some notes on the whole paper, it should be recognised that these diagrams illustrate the degree of correction on the axis only, and must not be taken as indicating performance of the lenses in the way of covering power. (Pp. 123 and 124.)

A piece of advice which we have given before, but which in these days of enhanced plate prices will bear repetition, is that photographers should prove to their own satisfaction the good results in the way of portraiture which are within their reach by taking the negatives on small plates and enlarging from them. Better-class studios might very well take a hint from the cheaper portrait businesses in utilising this measure of economy. (P. 122.)

The answer to a question asked in the House of Commons in reference to the Memorial Portrait Scheme of the National Portrait Gallery has not, as might have been anticipated, elicited anything in justification of the violent attacks some months ago of the Professional Photographers' Association. (P. 130.)

A correspondent who has lived in two districts, one served with a very soft water supply and the other with one of considerable hardness, writes to mention the very great effect of quality in the water supply on the blistering of prints in sulphide toning. (P. 130.)

Following the notice last week that considerable areas in the neighbourhood of London are now the subject of an Order prohibiting photography and even (unless under permission) the possession of photographic apparatus, we now publish a list of the areas in question and the address of the authority to whom inquiries in reference to permits to photograph may be addressed. (P. 130.)

A working method for the production of platino-surface carbon prints is worthy of notice at the present time by photographers who have a difficulty in getting platinum paper. (P. 121.)

A correspondent gives a number of hints drawn from his own experience in the use of a tank method of development. (P. 131.)

Something in the nature of a general rule which may be applied to determine in what position artificial lights should be placed in the studio is the subject of a paragraph on page 121.

A reference in an American contemporary to "adulterants" of soda sulphite leads us to say something of the two substances chiefly present in sulphite, namely, carbonate and sulphate. In low grade samples a very great amount of impurity may be present, and such [illegible] for photographic purposes. (P. 122.)

EX-CATHEDRA.

Platino Surface Carbons. In view of the growing difficulty of obtaining platinum papers and the ever-increasing cost, it may be useful to remind the profession of a method of making carbon prints which are entirely free from gloss even in the deepest shadows. The procedure is, if anything, more simple than that usually practised, and there is no additional outlay beyond the purchase of opal glass to serve as a temporary support in place of the usual "flexible." The opal glass must be finely ground, and it is desirable before taking it into use to smooth it a little with a flat piece of hard wood and a little emery powder and water. If the opal has a "satiny" feel to the finger this will not be necessary, and the preparation of the surface may be proceeded with. This is nothing more than well rubbing with powdered steatite or French chalk, which is dusted on or, better still, scraped from the lump with a knife. The powder must be rubbed on with a pad of cloth or flannel, considerable pressure being applied during the process, the surplus being wiped off with a soft duster. The exposed tissue is mounted and developed and transferred in the ordinary manner. It will be found that the prints strip easily, usually falling off the opals as they stand in the drying racks. It is worth noting that it is much easier to work with freshly sensitised tissue than that which has been allowed to become "ripe." If very hot water or soda has to be used to obtain clean prints there is a much greater chance of the tissue sticking to the temporary support than when development has been carried through at a lower temperature.

* * *

Artificial Lighting. We have pointed out on more than one occasion that the design of the studio does not affect the lighting of the model, that being entirely controlled by the direction and volume of the light admitted. It should be obvious to anyone who had taken a portrait by daylight that the same principle would be equally applicable to artificial lighting, but judging from the number of inquiries we receive it would seem not to be generally understood. The simplest plan for placing an artificial lighting installation is to put yourself in the position you intend the sitter to occupy when making plain three-quarter light pictures, and to place the light where you would expect to find the opening in the blinds of a daylight studio. After this it is only a matter of diffusion and reflection. When fitting lamps into an ordinary studio it will usually be found inconvenient to fix them between the glass and the sitter. In such cases it is best to put them on the solid roof side of the studio and light the sitter from that side, and if the construction of the studio will allow it, at the other end of the roof, so that the same side of the sitter's face can be taken by either day or artificial light. In an ordinary room it is simply a matter of arranging the sitter and light in the most convenient way. We have noticed, by the way, that when fitting half-watt lamps there is a tendency to place them too much to one side and also to have them too low. Another hint which cannot be repeated too often is to remember that neither the sitter nor the camera is screwed to the floor. Many photographers work as if the camera ran on a tramway and take infinite pains in adjusting blinds, when the same effect could be obtained by slightly turning the sitter and bringing the camera into such a position as will give the desired pose.

* * *

Sodium Sulphite. In an article in our American contemporary "The Camera" references are made to the presence of carbonate and sulphate as "adulterants" in sodium sulphite, which seems hardly a fair way of describing the facts. No doubt both ingredients can be used as adulterants, but still their presence in no way proves that the chemical has been adulterated, for one, the carbonate, is there almost of necessity as a consequence of the method of manufacture, while the other, the sulphate, is bound to appear as the result of oxidation even if not present in the beginning. Some time ago we had occasion to test a very large number of samples, including the purest then obtainable, and all contained from 2 to 5 per cent. of carbonate. No doubt this unwanted alkaline ingredient sometimes gives trouble, especially with developers that do not keep well with alkali, hence no doubt the success of the combination of sulphite and acid sulphite now so frequently used. Our contemporary also refers to hypo as an occasional adulterant. This certainly has no excuse for being present, but while we have often looked for it we never yet found any appreciable trace of it in any sulphite sample. There are, however, cheap sulphites that contain many things in addition to large quantities of sulphate produced by deterioration. Some contain impurities to the extent of 50 per cent., hence it is always advisable to order only a good reliable brand and to pay a fair price for it. Some cheap samples are next to useless.

* * *

The Plate Bill. The continued increase in the price of plates, impels us to recur to the question of economising by adopting smaller sizes for original negatives, and enlarging from these for the bulk of the work. One successful American portraitist testified to the success of this method, using only a 5 by 4 camera and enlarging as a rule to 10 by 8. Those who still use platinum and other printing-out papers must, of course, make their negatives the full size of the prints, but the majority of studios now employ one or other of the numerous developing papers, so that there should be no difficulty in this direction. Nor need there be any misgivings as to the quality of the results, since it is generally agreed that an enlargement from a negative of average quality compares favourably with a contact print; in fact, one of the most experienced trade printers in this country assured us that even for same-sized copies he preferred to do them "through the lens." The only doubt which many workers will have is whether the extra labour necessitated will not counterbalance any saving which may be effected in the cost of plates. If proper arrangements are made, there is no extra labour needed; in fact, the printer need hardly be aware that he is not making contact prints. The cheap postcard man almost invariably enlarges from a very small negative, and that with very primitive appliances. If the image had to be focussed for each negative, and the paper pinned up or centred in a frame, time would be lost, but it is perfectly easy to fit up a vertical enlarger with the light and lens either above or below the negative, so that in the one case the image is projected upon a table on which the paper is laid either under a mask or under a piece of glass, and in the other a frame and glass plate is used as in an ordinary printing-box. If gaslight is the only illuminant available the former arrangement is used; if an incandescent electric lamp can be fitted, either plan may be adopted as preferred. Taking the case of ordinary cabinets, a quarter-plate or even the 3½ by 2½ size will suffice for the negatives, and those who have not tried working on these lines will be surprised at the short exposures necessary and the good definition over various planes which can be obtained. There are many short-focus portrait-lenses which will cover a c.d.v. at *f*/3, and the negatives will yield enlargements in every way equal to prints from larger direct negatives.

AXIAL ABERRATIONS.

The paper on the axial aberrations of lenses by Messrs. Tillyer and Shultz, which we have reprinted from the Scientific Papers of the Bureau of Standards, Washington, U.S.A., forms a very valuable addition to optical literature. Optics is now receiving a great deal of attention in America, and the value of the American publications seems to be steadily increasing; a fact that we are very pleased to note, though we should be still better pleased if England showed more signs of progress in the same direction.

The main purpose of the paper is the demonstration of a system of measuring the axial aberrations of lenses, founded on the Hartmann method, but much improved. A very important feature is, however, the first part of the paper, which is devoted to the consideration of the errors affecting the image, and includes an admirable demonstration of zonal aberration and the sine condition; subjects which are seldom well treated by optical writers, partly, because they are complex and difficult to explain, and partly because the sine condition, in particular, is capable of several definitions. The authors appear to adopt the views of the Jena School in regard to this matter, but they succeed in giving a very clear exposition and explanation of what is a rather difficult subject. They seem, however, rather to take it for granted that the fulfilment of the sine condition is an essential thing in the perfect lens, though this is a point that has been much disputed, and seems open to great doubt.

The principle of the testing method is simplicity itself, though its application requires very delicate adjustments and measurement. It depends simply on putting a metal plate in front of the lens, perforated with small holes, which isolate minute beams of light. The course that these beams take is recorded on photographic plates, put at varying distances from the lens on its other side, and the relative positions of the plates being known, it is, of course, possible to calculate the exact course of the beams, and to ascertain how their central rays intersect one another; or, in other words, what kind of a focus they produce. The authors state that by selecting holes of suitable diameter they get good diffraction discs on the plates, which discs can readily be centred. This is where one of the delicate adjustments comes in, for if ill-defined patches alone are secured, it is obviously difficult to determine exactly what point in the patch should be taken. It also strikes us as the weak point in the system, for it is obvious that a very little carelessness or uncertainty in fixing the critical point for measurement may lead to serious error.

It is, of course, obvious that there is nothing new about the method of isolating small beams by means of a perforated plate, and then tracing their course. Hartmann was apparently the first to use it for lens testing, but others have frequently used it for optical demonstration purposes, and for modelling light-pencils. If the photographic records made on either side of the focus are reproduced in the form of perforated plates, these plates are set up opposite to each other, and the corresponding holes are connected with threads, very complete and instructive models are readily produced, which will convey more information in a few minutes, with regard to the action of a lens, than a long course of study of optical books will afford. A set of models of this kind was exhibited at the R.P.S. Exhibition some years ago, while we believe that South Kensington has long possessed some other models made on similar principles.

The examples of plotted results are interesting, and would be even more so if we knew the names of the lenses. It is interesting to note the high degree of correction that the projection lenses of the Petzval type show, and the apparent large variations evidenced by the anastigmats. It is perhaps necessary to warn readers that these diagrams illustrate the degree of correction on the axis only. The side scale marked "distance from centre of lens" refers only to the lateral distance of the hole in the perforated plate from the axis, or, in other words, gives the measure of half the diameter of the stop aperture, upon the circumference of which that hole is supposed to be situated. These figures have nothing to do with the diameter of the field covered on a plate placed at the focus, which will, perhaps, be the first impression conveyed by the diagrams. On the contrary this field is assumed to be very minute and situated on the axis, axial aberration alone being considered in this paper. This point must be borne in mind throughout, especially in the case of the anastigmats, which, as we have often pointed out before, and as the authors again point out in their paper, are very often intentionally left rather poorly corrected on the axis, in order that better results may be secured near the margins of the wide field required. A photographic lens is essentially a thing of compromises; for more is required of it than can ever be fulfilled perfectly throughout.

SOME MINOR PROCESSES OF PHOTOGRAPHY.

(The Twentieth Traill-Taylor Memorial Lecture delivered before the Royal Photographic Society by C. H. Bothamley, M.Sc., F.I.C.)

(Continued from page 113.)

Chromium Intensifier.

In this process which was worked out in detail, though not actually invented, by C. Welborne Piper and the late D. J. Carnegie ("Amat. Phot.," 1904, pp. 336 and 397, and 1905, pp. 453, 473), the negative is treated with a solution of potassium bichromate acidified with hydrochloric acid, and the bleached image, after washing, is treated with an ordinary developer. According to Piper and Carnegie, the bleached image contains a chromium compound, which they suggest may be the so-called chromium dioxide, CrO_2, generally regarded as chromic chromate, Cr_2O_5. They established the presence of chromium, but not the precise nature of the chromium compound.

I made experiments in order to get some information as to the exact mode of action of this intensifier. A solution of *pure* chromic acid alone, 2 parts in 100, acts readily on negative and positive images, and in time will completely remove the silver from even a dense negative if a sufficient volume of the solution is used. [Specimen shown.]

A solution containing only 5 parts of chromic acid in 1,000 parts of water also has a distinct, though slow, reducing action. The silver is dissolved as silver chromate whilst part of the chromic acid is reduced to the condition of a chromic salt; the image that remains consists of unaltered silver.

A 5 per cent. solution of very carefully purified potassium bichromate, free from chlorides and free from chromic acid, has no action, even after 48 hours' immersion, on a negative which has been washed free from chlorides. Similar results were obtained with lantern slides, notwithstanding the finer grain of the silver.

Further, a solution containing pure potassium bichromate (5 in 100) and pure salt, but no free chromic acid, also has no recognisable action on the silver image.

It follows that the bleaching effect is due to the simultaneous action of chromic acid and potassium chloride, formed by the action of the hydrochloric acid on the potassium bichromate.

I find, in fact, that a solution containing pure chromic acid and pure salt readily bleaches silver images, with results not distinguishable from those obtained with a solution of bichromate mixed with hydrochloric acid.

I also made some experiments concerning the composition of the bleached image. It clearly does not consist of pure silver chloride, because it has a pronounced brown colour, much more distinct with formula A than with formula C (see below). There is, in fact, no difficulty in detecting the presence of chromium, by the ordinary tests, in both the bleached and the redeveloped image, though the proportion seems to be smaller in the latter.

Further, if the bleached and thoroughly washed image is carefully treated with a dilute solution of caustic potash, potassium chromate passes into the liquid and gives it a yellow colour. If now the negative is again well washed the image is still found to contain chromium, but only in the basic chromic condition. *It follows that the brown constituent of the bleached image is a chromic chromate.* When the bleached image is treated with a developer this chromic chromate is reduced, and part at least of the chromium remains in the chromic condition in the image, mixed with metallic silver. The amount of chromium so left is very small when the C formula is used.

The three working formulæ recommended by Piper and Carnegie are:—

	A	B	C
Potassium bichromate...	5 grains	10 grains	10 grains
Hydrochloric acid (sp. gr. 1·160)	1 minim	5 minims	20 minims
Water	1 oz.	1 oz.	1 oz.

or approximately—

	A	B	C
Potassium bichromate	10 parts	20 parts	20 parts
Hydrochloric acid (sp. gr. 1·160)	2 parts	10 parts	40 parts
Water ....up to	1000 parts	1000 parts	1000 parts

They stated that formula A gives a high degree of intensification, and formula C a low degree, whilst formula B gives an intermediate result. The strip negatives shown on the screen confirm these statements. The degree of intensification obtained with B is nearer to that obtained with A than to that obtained with C. The result is determined by the relative proportions of acid and bichromate and the proportion of acid is the dominant factor. In order to obtain concordant results with certainty, it is of great importance to make up the formula with more than usual care and accuracy. It is unfortunate, therefore, that the formulæ as commonly published specify the use of concentrated hydrochloric acid, which is not easily measured accurately with the means usually at a photographer's disposal, especially when quite a small quantity is required, as with formula A. It is a much better plan to dilute the strong acid by adding 9 equal parts of water and then measure out ten times the volume of dilute acid, so that the formulæ would read:—

	A	B	C
Potassium bichromate	10 parts	20 parts	20 parts
Hydrochloric acid, dilute (1 in 10)	20 parts	100 parts	400 parts
Water ....up to	1000 parts	1000 parts	1000 parts

Piper and Carnegie recommended amidol as the developer to be used after bleaching with the bichromate and washing. In my experiments, when formula A is used, the degree of intensification is the same, whether re-development is effected with amidol or diamidophenol, or with metol-hydroquinone, but with formula C the results indicate a slightly lower degree of intensification when metol-hydroquinone is used.

With formula A the intensification is due in a substantial degree to the chromium compound which has been added to the image; with formula C the intensification is mainly due to an increase in the size and light-stopping power of the silver granules, due to their conversion into chloride and subsequent redevelopment (see W. T. P. Cunningham in "Phot. Journ.," lvi. (1906), p. 2).

Experiments were made with mixtures of chromic acid and purified common salt, the bleached image being afterwards redeveloped with diamidophenol and sulphite. The chromic acid and salt are easily weighed out accurately, and separate stock solutions, 1 in 10, can be kept unchanged for any length of time. If the image is bleached with—

Chromic acid	4 parts,
Salt (sodium chloride)	4 parts,
Water	up to 1,000 parts,

and redeveloped, the result is practically identical with that given by Piper and Carnegie's formula A.

Some experiments were tried as to the influence of the relative proportions of acid and salt:—

	D	E	F
Chromic acid	2½	5	2½
Salt (sodium chloride)	2½	2½	5
Water.......................up to	1000	1000	1000

The intensification with D and F is identical, and is a little higher than with the stronger solutions given above, but the intensification obtained with E is distinctly lower than with D and F. Sections of the same strip negative were treated with the different solutions, and the measurements were made with a Sanger Shepherd densitometer.

Densities.

D	4·7	7·0	9·0	12·5	15·3	17·3
E	4·0	6·0	7·7	10·5	13 5	15·7
F	4·5	7·0	9·0	12·5	15·5	17·5

The chromium process is of great practical value, as many have already recognised; it is easy to work, and if care is taken in making up the bichromate and acid solution it gives concordant results. Moreover, it is applicable to negatives, lantern slides, and bromide or gaslight prints. Formula C not only gives that slight degree of intensification which a print often needs, but may also greatly improve the colour of the image. With a still larger proportion of acid there is still less intensification, but at the same time a distinct improvement of colour, if, for example, the original image has had the well-known olive-green tint.

C. H. BOTHAMLEY.

(To be continued.)

AXIAL ABERRATIONS OF LENSES.

[We are indebted to the Bureau of Standards of the United States Department of Commerce for the following paper, which deals with the chief axial aberrations of lenses and describes in detail the practical method worked out by the Bureau, based upon that of Hartmann for the measurement and plotting of the aberrations. In reproducing the text of the paper, exigencies of space have compelled the omission of one section, namely, that dealing mathematically with the sources of error. A brief abstract of this section is inserted in the text as printed, in its appropriate place.—EDS. "B.J."]

(*Continued from page* 115.)

The apparatus used consisted of the following:—*R* (Fig. 8) is a monochromatic source of light, which in this case was a Fuess monochromator giving a fairly pure band of the spectrum of about $4\mu\mu$ in width in the violet ($425\mu\mu$) to about $21\mu\mu$ in the red ($650\mu\mu$). The illuminant was a Nernst filament close to the slit. The width of the band of spectrum was determined with a Hilger wave-length spectrometer, which had been checked up by means of a mercury arc. The monochromator was placed about 20 feet away from the screen, and corrections applied to reduce the results to infinity. The screen *S* was a metal plate accurately centred with respect to the lens holder. The holes used for fairly large-sized lenses were 1 mm. in diameter, and spaced at intervals of 3 mm. apart. For smaller lenses a screen with smaller holes spaced closer together was used, permitting a suitable number of zones to be determined. If the holes are too small or too near together, the diffraction discs will not be clearly defined, and it will be impossible to measure them. The lens holder, *L*, is of the iris diaphragm type, so that the lens is always centred with respect to the holder, and therefore with respect to the screen. The lens holder rotates about a vertical axis, permitting the lens to be centred with respect to the photographic plate. The photographic plate *P* slides on an optical bench *B B* along a scale. The plate can be raised or lowered, permitting several exposures to be made on the same plate.

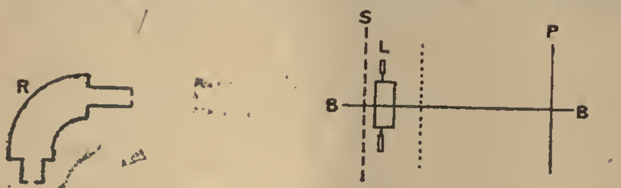

Fig. 8.—Diagrammatic Sketch of Apparatus.

2. METHOD OF MANIPULATION.—The lens is placed in the holder, care being taken that it is fairly well centred. It is then accurately centred by reflection from the back of the lens For this purpose a ground-glass plate with a little 90° prism cemented to it (leaving a clear space in the ground-glass surrounding the prism) is placed in the plate-holder. The prism is used to send a beam of light to the rear lens surface. When the beam is reflected on itself by the lens and comes back to the observer through the clear space around the prism, then the lens is normal to the direction of motion of the plate, and the centring is accurate.

The monochromator is then set to give a beam of wave length $425\mu\mu$, the plate placed at a considerable distance in front of the focus and an exposure made. The plate is then lowered, the monochromator changed to give a beam of wave length $475\mu\mu$ and another exposure made. This is repeated with the monochromator set at $550\mu\mu$ and $650\mu\mu$. The plate is then moved through a distance *d*, previously determined, so that the plate now comes behind the focus.

The exposures are repeated through the wave lengths 650$\mu\mu$, 550$\mu\mu$, 475$\mu\mu$, and 425$\mu\mu$. The length of exposure is timed so as to get uniform density on the plate for all colours, giving discs which can easily be measured on a Zeiss horizontal comparator or measuring engine with sufficient accuracy for rays somewhat removed from the axis of the lens.

[Here follows a mathematical discussion of the effects of various sources of error, it being proved that the effect of a slight tilting of the plate, and also of an error in d, is negligible. In the case of an error in a or b, an error of δa in a, or δb in b will cause an error in $(E-V)$ equal to $d\,\frac{\delta a}{a}$ or $\frac{\delta b}{b}$. Errors due to measurements, to irregularities in the plates, and to different observers, are as follows:—The probable error of a single observation of two plates is 0.06mm. in V and 0.04mm. in E. The probable error of a single observation for two observers is 0.02mm. for V and 0.05mm. for E. In plotting, the probable error is reduced with the values of ΔV and ΔE by $\frac{100}{\text{E.F.L.}}$, or inversely with the focal length.—Eds. "B.J."]

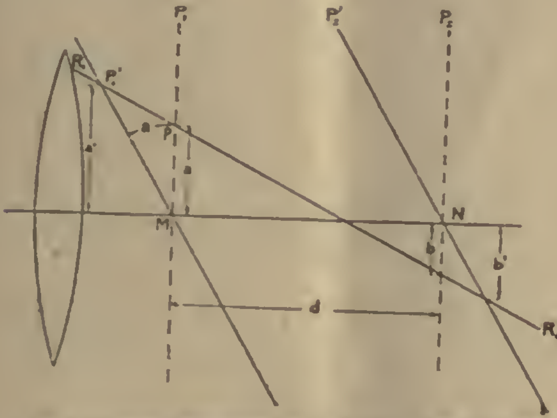

Fig. 9.—Diagram illustrating a tilt of the plate to the lens axis.

4. Method of Plotting.—The method of plotting the results has been described in the discussion of spherical and sine condition aberrations. The mean values for V and E were so chosen as to show the places of best correction of the lenses in question. Thus, the values of the first two central zones in all cases were disregarded (in taking the mean), as these values are unreliable. In photographic lenses, where no provision is made for the correction of the red rays, the mean of the yellow green, blue, and violet was taken. On the other hand, in projection and telescope lenses, the violet was disregarded, and the mean of the red, yellow green, and blue was used. The mean values of V and E were then subtracted from each of the values of V and E respectively, and the resulting differences reduced to 100 mm. focal length. This procedure makes the vertical axis the mean value for both E and V. A deviation from the axis means an aberration. The dotted line shows the variation of the E. F. L., and the solid line shows the spherical aberration. The distance between the curves ΔE and ΔV is a measure of the coma.

The curves for each wave length are plotted separately, so as not to create confusion, but the vertical axis represents the same line, and, for comparison, the figures should be superposed with the axes coinciding, or else the distances from X Y should be compared.

The vertical distances h have been magnified four times, and the horizontal distances twenty times, in accordance with convention used by Von Rohr and others.

The wave lengths used were:—

Limits of Band.	Mean.	Colour.
	$\mu\mu$	
423 427$\mu\mu$ (about)........................	425	Deep violet
475-479$\mu\mu$ (about)........................	475	Blue
547 558$\mu\mu$ (about)........................	550	Yellow-green
647 663$\mu\mu$ (about)........................	650	Red

The "limits of band" gives the width of the band of spectrum used for each colour.

5. Applicability of Method.—The method can be successfully used on all optical systems of relatively large aperture and short enough focus to permit the plate to be placed sufficiently near the focus to obtain strong light, and still separate the discs a measurable distance. The diameter must be large enough to obtain several zones without crowding the holes in the screen too close together. Such lens systems are photographic lenses, short-focus telescope objectives, etc.

The method has been used on complete instruments, such as telescopes. In a complete telescope the consideration for a theoretically perfect image requires the rays to be parallel on coming out of the eyepiece. In general, they will not all be parallel, but some will intersect the axis at some point behind the exit pupil. If we take two shadowgraphs, one near the exit pupil and one some distance behind it, we can obtain the intersections of the rays with the axis.

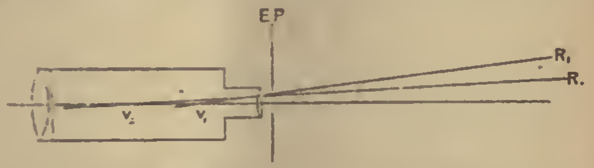

Fig. 10.—Method applied to complete telescope.

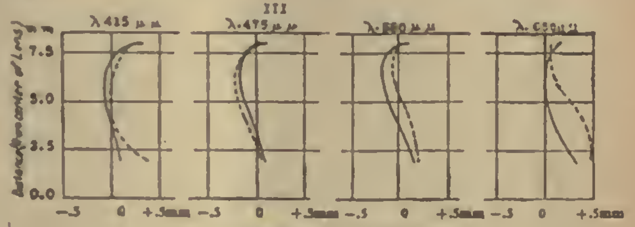

Fig. 11.—Photographic anastigmat lens

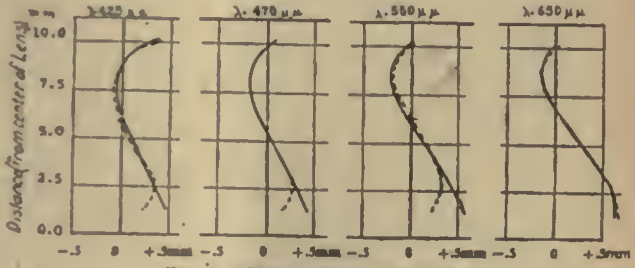

Fig. 12.—Photographic anastigmat lens

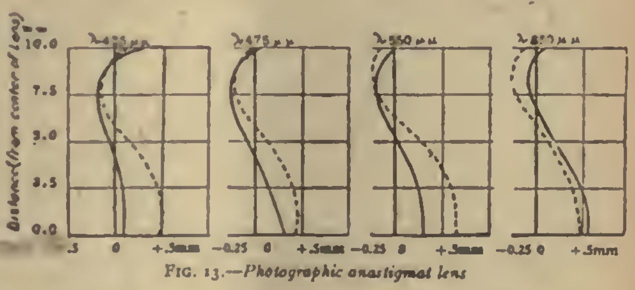

Fig. 13.—Photographic anastigmat lens

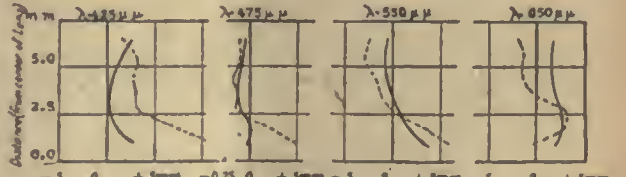

Fig. 14.—Photographic anastigmat lens

Spherical aberration ——————
Sine condition ....

Let R_1 and R_2 (Fig. 10) be two rays intersecting the axis at distances V_1 and V_2 from the rear principal plane of the instrument. Then U_1 and U_2 will be such distances that

$$\frac{1}{U_1} = \frac{1}{f} - \frac{1}{V_1}$$
$$\frac{1}{U_2} = \frac{1}{f} - \frac{1}{V_2}$$

where f is the accommodation used by the observer.

$$\frac{1}{U_1} - \frac{1}{U_2} = -\frac{1}{V_1} + \frac{1}{V_2} = -\left(\frac{1}{V_1} - \frac{1}{V_2}\right)$$

The quantity $-\left(\frac{1}{V_1} - \frac{1}{V_2}\right)$ represents the range of accommodation the eye has to assume simultaneously in focussing the rays from the instrument on the retina. Since this is independent of f, we see that it does not depend on the observer's eye, nor on the amount of accommodation he requires in using the telescope, nor whether the telescope is focussed on a near object or a distant object, but depends only on the difference in power of the various zones.

6. ILLUSTRATIVE DESCRIPTION OF A SET OF CURVES.—To illustrate the meaning of a set of curves, let us take the lens represented by Fig. 25. This is a foreign-made projection lens of the Petzval type for motion-picture projection work. A glance at the curves shows that the lens is best corrected for that region of the spectrum between $475\mu\mu$ and $550\mu\mu$, or between the yellow-green and the blue. Here the dotted curve and the full almost coincide, showing freedom from coma near the axis. At about 13 mm. out from the lens centre the curves show appreciable separation. This corresponds to an aperture 1 : 3.9 $\left(\frac{100}{2 \times 13} = \frac{1}{3.9}\right)$. At this aperture the maximum value of $\Delta E - \Delta V$ is 0.09 mm. for wave length $550\mu\mu$, and 0.05 mm. for wave length $475\mu\mu$ (disregarding the centre zone of the lens); for wave length $425\mu\mu$, or the violet, the spherical is practically zero, but the two curves do not fit so closely, $\Delta E - \Delta V$ becoming equal to 0.15 mm. This is quite small, but it is three times that of wave length $475\mu\mu$ and twice that of wave length $550\mu\mu$.

This lens being designed for projection work, the colour correction should be between the red and the blue—that is, the red and the blue would focus in the same point and the others not far away, with no attention paid to the extreme violet. The distance of the full line from the axis (the zero line) gives the amount of colour aberration for the particular colour. The average distances of the four colours from the axis, using the mean of the red, yellow-green, and the blue as zero, are as follows:—Violet, −0.18 mm.; blue, −0.13 mm.; yellow-green, 0.00 mm.; and red, + 0.22 mm. This shows the red to be far out of achromatism, as it focusses 0.35 mm. and 0.40 mm. behind the blue and violet respectively. The progression of the curves in the same direction (−0.18 mm. to + 0.22 mm.) shows that no two colours focus at the same point, hence there is no colour correction.

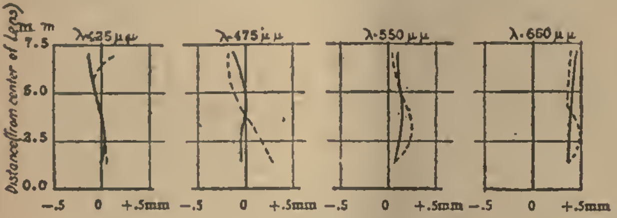

FIG. 15.—*Photographic anastigmat lens*

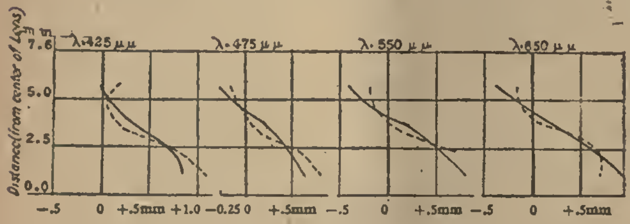

FIG. 16.—*Old type Rectilinear lens*

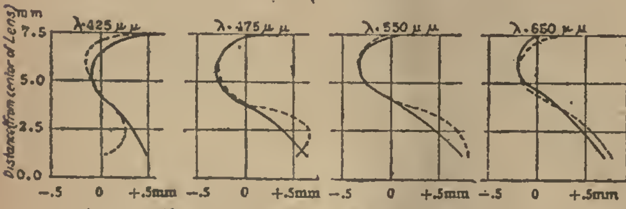

FIG. 17.—*Photographic anastigmat lens*

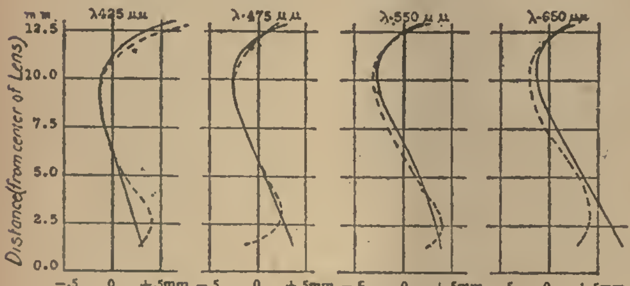

FIG. 18.—*Photographic anastigmat lens*

Spherical aberration ——————

Sine condition ....

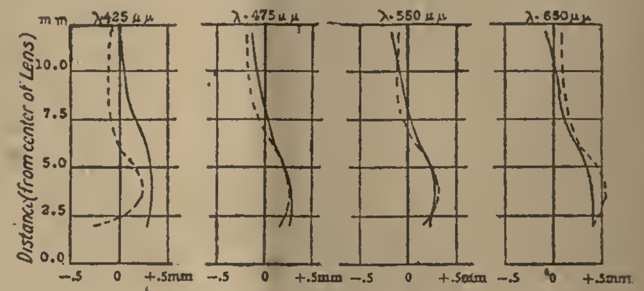

FIG. 19.—*Projection lens*

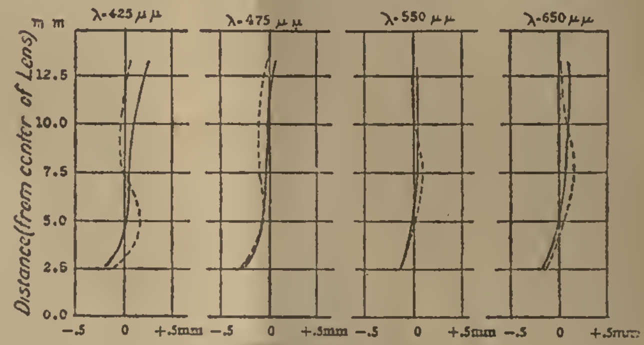

FIG. 20.—*Projection lens*

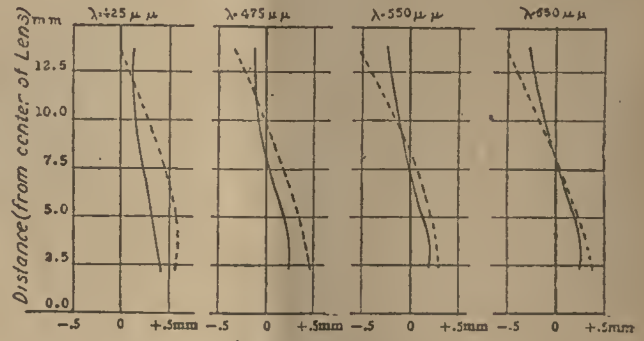

FIG. 21.—*Projection lens*

Spherical aberration ——————

Sine condition ....

the distance of the dotted curves from the axis shows the variation of the E. F. L. with the colour, hence the variation of the size of the image with the colour. This is the oblique achromatism. These average distances for each colour are as follows:—Violet, −0.18 mm.; blue, −0.13 mm.; yellow-green, +0.06 mm.; and red, +0.25 mm.; that is, the red image is 0.4 per cent. bigger than the violet, with the sizes of the other images in between. Hence the image projected by this lens shows red fringes on the outside and violet on the inside. This lens could be better used to advantage with a colour screen, as each colour is well corrected for itself; but the only colour for which the variation is small is the blue, and there is no real achromatism as defined earlier in this paper.

The other sets of curves furnish similar information regarding the other lenses, allowing us to draw conclusions as to the [illegible] of the lens as far as the center of the field is concerned.

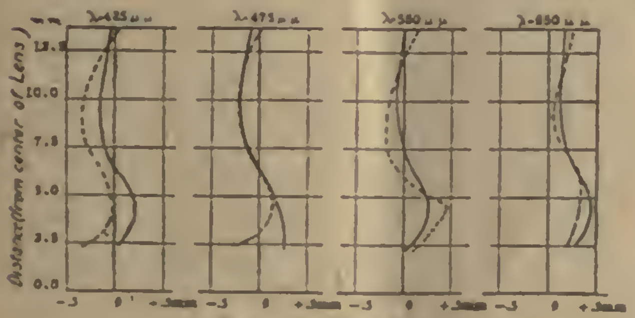

FIG. 22.—Projection lens

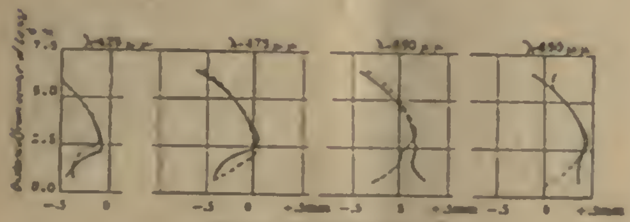

FIG. 23.—Projection lens

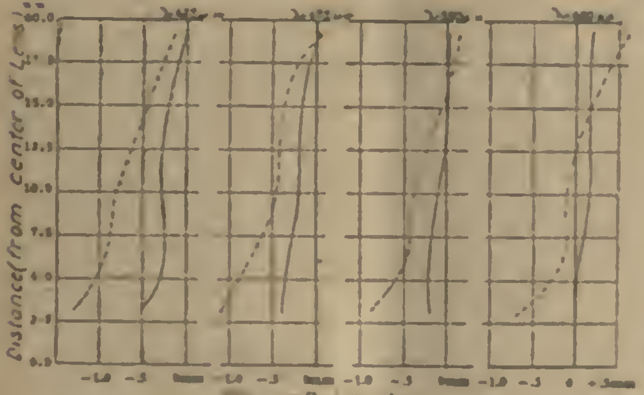

FIG. 24.—Projection lens

Classification of Curves.

The following curves divide themselves into [illegible] groups of lenses of several classes. Figs. 11 to 15 represent various types of photographic lenses. The curves here run very smoothly, showing good work in surfacing, as most of these lenses are of a high-grade make. Figs. 1[illegible] and 15 are not so regular, but the residuals are so small as to be negligible in any case. Fig. 16 is of an old type portrait lens; the [illegible]. It will be noticed that the spherical aberration in Fig. 16 does not begin to return at the axis. [illegible] they either cut the axis again or approach it.

Figs. 19 to 26 are projection lenses of the Petzval type.[3] The curves are not smooth and regular, showing less care in surfacing than in the photographic objectives. The lenses represented by Figs. 19 to 23 were made in this country, the others being imported. It will be seen that our (United States) domestic lenses compare favourably with foreign ones. Figs. 24 and 26 show considerable coma. All the lenses of this group are of rather large aperture, the largest being *f*/2.7 approximately.

Fig. 27 is a telescope objective (aperture *f*/3.3) made by Zeiss. The lens is exceedingly well corrected for wave length 550$\mu\mu$, which is the brightest yellow region of the spectrum, with the red and the blue not far away. The violet has been entirely neglected. This is also true of the colour correction of the projection lenses, as they all have to be used for visual work.

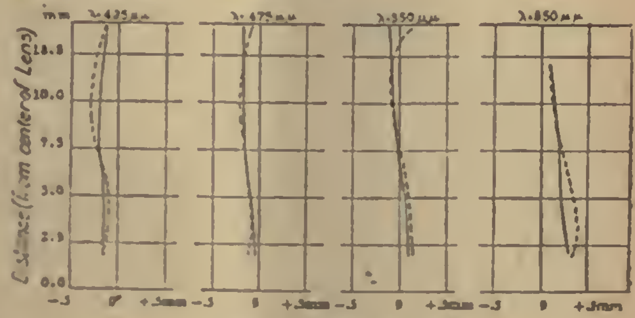

FIG. 25.—Projection lens

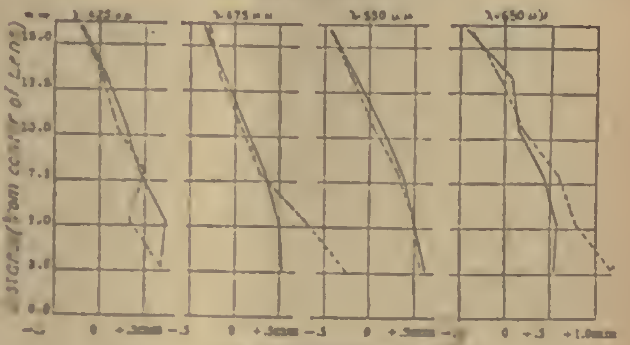

FIG. 26.—Projection lens

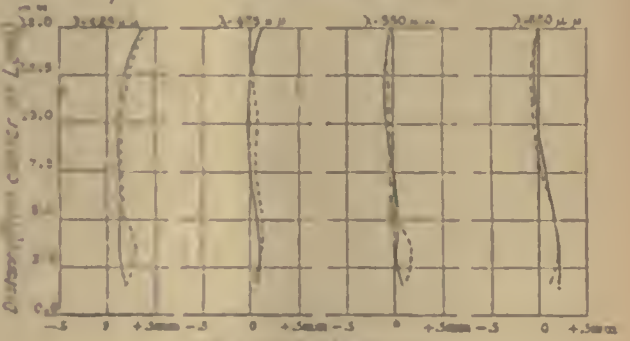

FIG. 27.—Zeiss telescope lens

Summary

The errors which affect the definition of a lens are discussed and methods of representing graphically the central errors described. The condition for freedom from coma near the axis is arrived at. The relative importance of the errors in the different types of lenses is discussed. Hartmann's method is extended, permitting one set of measurements to give all the important central errors: spherical aberration, zonal variation of the equivalent focal length, axial and oblique achromatism. The apparatus and the procedure are described, and the accuracy of the adjustments and measurements discussed. The method is applicable to all systems of relatively short focus and large aperture, such as photographic lenses, projection lenses, and telescope objectives, and also to complete optical systems. The results of the method as applied to a complete telescope are discussed, and are shown to be independent of the accommodation of the observer. Seventeen sets of curves for as many different lenses are given and an illustrative discussion of one set of curves, together with a general description of the types of lenses represented by each group of curves.

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[3] First brought out by J. Petzval in 1840. It is described in all books on optical instruments.

E. D. Tillyer.
H. I. Shultz.

New Materials, &c.

Palladiotype (Matt Surface) Printing Paper. Made by the Platinotype Company, 66, Beckenham Road, Penge, London, S.E.20.

Makers of photographic portraits will welcome the issue of a further variety of Palladiotype paper—namely, one with a natural surface and yielding prints of brown colour, as distinguished from the original issue, with its semi-glossy surface and black "colour." Now that platinum is almost unobtainable for purposes not directly connected with munitions of war, photographers will surely be grateful to the Platinotype Company for the scientific skill with which they have produced a printing material which in its effects—and we believe also in the permanence of its results—is able to rank on an equality with Platinotype. The surface of the new grade of Palladiotype is an exceedingly pleasing one, a close match to that of the natural surface of the paper itself. The colour of the prints—a brown, or as some, perhaps, would prefer to call it, a warm black, others a deep sepia, is also one which goes well both with portraits against a dark background and consisting for the most part of the low tones and with those in a high key in which light draperies against a white ground are the predominant features.

The manipulation of the paper is of as simple a character as that for the original grade; in fact, is identical with it, except that the clearing baths require to be of half strength, by diluting the solutions prepared according to the original instructions with an equal bulk of distilled or boiled water. The solution used as the developer may also be diluted in like proportion, and somewhat softer results thereby obtained. In dealing with negatives which are somewhat on the flat side for this paper, a pleasing degree of contrast may be secured simply by adding a minute quantity of bichromate of potash to the developer.

Considerably quicker in printing than cold bath Platinotype, as certain in its results and as free as the latter from the need of long washing, Palladiotype paper clearly recommends itself to those who, in these days of restricted staff and demands for the highest class of print, are sometimes at no little difficulty to satisfy their customers. Of the permanence of Palladium prints we have briefly spoken above; while the evidence of time is still wanting, there is every chemical reason to suppose that the image of a Palladium print will last as long unimpaired as one obtained on Platinotype paper.

◆

Missing Watch Pocket Cameras.—Messrs. W. Butcher and Sons, Ltd., ask us to state that the following cameras are missing, and believed to be stolen in transit:—Model VII., Ross Homo, No. 62,777; Model VIII., Velos 6.3, No. 62,118; Model VII., Velos 6.3, No. 62,961; Model VI., Aplanat, No. 63,129. The numbers will be found engraved in white letters on the back of the cameras. If offered to any dealer, will they be good enough to notify the above firm at Camera House, Farringdon Avenue, E.C.4.

The Rontgen Society has recently founded an annual lecture in memory of its first President, the late Professor Silvanus P. Thompson. The first "Sylvanus Thompson Memorial Lecture" will be delivered by Professor Sir Ernest Rutherford, F.R.S., at the next meeting of the society, to be held on Tuesday, April 9, 1918, at 8 p.m. The Council will be pleased to welcome all interested, and applications for cards of admission should be made to the hon. secretary of the society, Dr. S. Russ, Middlesex Hospital, London, W.1. Further particulars will be announced in due course.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, March 18.

South London Photographic Society. "Chat on Pictorial Photography." S. Brigden.
Dewsbury Photographic Society. Smoking Concert.
City of London and Cripplegate Photographic Society. "Enlarged Negative Making." B. C. Wickison.
Bradford Photographic Society. Yorkshire Photographic Union Prints and Members' Print Night.

Tuesday, March 19.

Royal Photographic Society. "Development: The Practical Side of the Matter." N. E. Luboshez.
Birmingham Photographic Society. "The Civilisation of the Ancient Egyptians." E. S. Phillips.
Hanley Photographic Society, Y.M.C.A. Members' Night. A. W. Harding.
Sheffield Photographic Society. "A Plea for Humour." Yorkshire Photographic Union Slides. R. H. Minshall.
Stalybridge Photographic and Scientific Society. "Elementary Photography of Animals and Birds." W. L. F. Wastell.
Monklands Photographic Society. "Mounting Prints and Passe Partout." W Coghill.
Manchester Amateur Photographic Society. Council Meeting.

Thursday, March 21.

Hull Photographic Society. "Holiday in North Yorkshire." H. Cook.
Huddersfield Naturalist and Photographic Society. "Here and There with a Camera—Ryedale." E. S. Maples.
Liverpool Amateur Photographic Association. "The German Destruction of Churches and Architectural Monuments in Belgium and France, 1914-15." J. G. Legge.
Hammersmith (Hampshire House) Photographic Society. "Some Curiosities seen through the Microscope." G. Ardaseer, F.R.P.S.
Rodley and District Photographic Society. Members' Night.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held on Tuesday, March 12, Dr. G. H. Rodman in the chair.

A lecture on a convenient accurate photometer for the measurement of photographic densities, by Messrs. D. E. Benson, W. B. Ferguson, and F. F. Renwick, was delivered, Mr. Renwick dealing with the evolution and purposes of the instrument, Mr. Benson with its construction, illustrated with diagrams, and Mr. Ferguson with its employment. In the absence of diagrams, much of what was a most interesting lecture must be omitted or referred to very briefly. In a general way the instrument consists of a dark chamber, 31 in. long, 5 or 6 in. high, and 4 or 5 in. broad: the roof and walls are formed by close-fitting velvet curtains running on metal rods, which are the angular supports. The chamber is supported on a cast aluminium base, and can be worked on its longer axis. At the right-hand end is the source of light—an electric lamp; the light from this is reflected by mirrors travelling on smooth rods running the entire length of the instrument, and is brought to bear upon two opal plates. The illumination of these plates is equalised by sliding the mirrors to and fro, and in doing so an index travels along a scale situated along the front. Care has to be taken to adjust things so that before measurement is begun the index stands at or near zero. The plate to be measured is placed over one of the opal glasses, and the mirrors are then slid along till the illumination is again equal, when the density of the part measured may be read off directly from the scale. To facilitate the measurements, a telescope is hinged over the plate operated upon, and as this projects horizontally or at a suitable angle, the readings are obtained in a way causing the minimum of fatigue to the observer.

Mr. Renwick said 75 per cent. of photographers doubtless wondered why all this bother was taken about photometers, but these instruments were to the scientific photographer what the balance was to the chemist. The usual estimation of densities was altogether fallacious, and he hoped the time was not far distant when every statement on the subject would be supported by quantitative photometric data. From time to time articles appeared in the photographic press urging readers to make measurements of the kind, aided only by such appliances as might be found in the dark room. Mr. Renwick disagreed with these suggestions; a photometer of some kind was absolutely necessary. A useful instrument might be made by anyone acquainted with the use of tools, and if the essential parts were accurate and worked smoothly, much valuable work might be done, although, of course, the precision and delicacy of Mr. Benson's handiwork were invaluable for important work.

The method adopted in the instrument before him was based on the law of inverse squares, and, to ensure success, the light must be sufficiently powerful and under control, and the distances between the source of light and the points where the readings were made must be capable of the most exact adjustment. The scale should be so long that the divisions are not crowded together so closely as to be difficult to read. One of the oldest of photometers was that designed by Schmidt and Haensch, but its construction was such that, using a candle power of 1,600, it was difficult to read with accuracy densities of 2, and as the readings were made when looking down vertically, the fatigue induced by the pressure of blood upon the eye was most trying, and interfered to a considerable extent with the accuracy of the measurements. The source of light should be one readily obtainable, and a flame such as that of an oil lamp was very unsatisfactory, notwithstanding the fact that Hurter and Driffield used it in their work. The lecturers had adopted a small electric lamp of the type used in the ordinary motor head lamp, and while with the Schmidt and Haensch photometer it was difficult to measure higher than from 1.5 to 1.8, and then only after resting the eye in the dark for some time, it was quite possible with the new instrument to measure up to from 1.8 to 2.8, and for X-ray work that could be increased much higher by the use of the Ediswan "Point-o'-light" lamp and some adjustments of the instrument. As the voltage required was not more than six, it was possible to get the current from primary batteries, accumulators, or direct from the main by interposing resistances. It was a convenience to be able to measure the densities of a plate without having to cut it up into half-inch strips, and some sacrifices had been made to obtain that convenience in the new instrument. It was another convenience to be able to sit comfortably in a chair and look through a horizontal tube or to incline the tube to any desired angle by rocking the instrument on its axis. It was also possible to locate the point on the plate to be measured to within 1-100 of an inch, a thing impossible with previous instruments. An attempt had also been made to measure the light reflected from surfaces as from a photographic print. This part of the work was still in an experimental stage, but he had every reason to believe it would be successful.

Mr. Benson then showed diagrams of the construction, and his explanations would not be understood without them.

Mr. Ferguson said that a photometer he had designed some years ago had been the basis on which Messrs. Benson and Renwick worked, but these gentlemen had so improved and transmogrified the original design that the instrument on the table bore no apparent resemblance to it. In using the photometer, it was important to balance the light until the central bull's-eye in the opal disc disappeared. The index error to the right or left of the zero point had then to be found, and he preferred to make a number of tests, working first from the right to the left and then from left to right, and to take the mean of the observations. It was desirable that the electric current should be fairly regular; in using the alternating current he found it desirable to use the choking coil in preference to resistances, although these latter were satisfactory when the continuous current was employed.

He proceeded to say that photometers varied in their readings just as watches differed in their time-keeping qualities. Mr. Renwick had, however, devised a method of standardising the various readings, so that all were comparable.

Several members of the audience asked questions on various points, the required information being given, and all concurred in expressing their appreciation of the improvements which had been effected in photometer construction.

RONTGEN SOCIETY.

At the meeting held on March 5, papers were read by Dr. C. R. C. Lyster and Dr. S. Russ on "A Biological Basis for Protection against X-rays." In this contribution the study of the protection of X-ray operators was approached from a somewhat different point of view from that usually adopted. In previous investigations the materials have generally been tested to ascertain what fraction of the incident rays are transmitted, while in this case an attempt was made to measure the total quantity of radiation received by the operator during, say, a day's work under normal conditions. For this purpose the operator carries a photographic plate upon his person, and at the end of the period under consideration the plate is developed. The density of the resulting image is compared with that of another plate termed the "biological basis plate," which has been exposed under standard conditions of radiation. A preliminary investigation enables the harmful effects of the standard source of radiation to be determined, and thus gives a meaning to the indication of the biological basis plate.

Radium forms a useful source of radiation for practical purposes after the initial tests have been made, and it overcomes difficulties in the employment of an X-ray tube as a constant source.

The effect of hard and soft radiation (12-inch spark to 2-inch) on the photographic plate was fully investigated, and it was concluded that for the same ionising effect the hard and soft rays produced about the same photographic effect; the effect, however, varies with different makes of plates, and in consequence all comparisons must in practice be made with the same variety.

"A Mobile X-ray Unit."—Mr. E. C. Head gave a detailed description, illustrated by numerous photographs, of a motor X-ray unit recently designed and constructed for use in Mesopotamia, etc. The Austin Chassis was chosen on account of its low load line, and the body was divided into two portions, one to serve as dark room, while the other contained the X-ray equipment. In operation a tent is erected at one side of the car, with the result that it is unnecessary to remove the coil or switchboard for use. Electric current is supplied from a dynamo run off the motor engine and from a small battery of accumulators, and is sufficient to render possible the production of short-exposure radiographs.

News and Notes.

Rotogravure Tissues.—The Autotype Company, 74, New Oxford Street, London, W.C.1, send us a price-list, just issued, of the tissues and other materials for rotary photogravure, which are specialties of theirs. The list includes some pages of practical notes on the working of the rotary photogravure process, among which those engaged in this method will find some hints of value.

Photographic Mounts.—A catalogue of the many descriptions of mount, amateur and professional, manufactured by them has just been issued by Messrs. W. Butcher and Sons, Ltd., Camera House, Farringdon Avenue, London, E.C.4. It is well illustrated, and lists also many items of miscellaneous photographic stationery, such as wallets for photographs, envelopes, passe-partout materials, and postal wrappers.

The Sunic Record.—The current issue of this very practical monthly journal of X-ray work contains, among other articles, one on the dangers (and preventives therefor) in X-ray practice, another on the use of the fluorescent screen. X-ray operators should make a point of getting each copy of the "Sunic Record," as they may do without cost by application to Messrs. Watsons, 196, Great Portland Street, London, W.1.

How to Make Portraits.—A revised and enlarged edition of this little manual, issued by the American Photographic Publishing Company, 22a, Columbus Avenue, Boston, Mass., has just been issued. In noticing previous editions we have commented upon its very practical instruction in indoor and flashlight portraiture. The fact that 30,000 copies have now been published altogether is sufficient tribute to its usefulness to the amateur worker. It is issued in paper covers at 25 cents; cloth bound, 50 cents. In making remittances to the United States it may be pointed out that the method should be that by international 5-cent coupons, obtainable at any post office, not by postal orders, which are not negotiable in the United States.

The Manchester College of Technology.—In order more adequately to denote its University rank, the title of the Manchester School of Technology has been changed to "College of Technology," a name more in accordance with the advanced nature of the courses of instruction and with the facilities for research work which are available within its walls. At the present time much research of a confidential character for war purposes is being carried on, and this part of the activity of the College of Technology will be further stimulated in the future by the number of research scholarships, of the value of £100 a year each, which are now within the gift of the governing body. It scarcely needs to be recalled that photography and photo-mechanical processes constitute one of the Faculties of the college, normally under the direction o

Mr. Charles W. Gamble, for whom, during the period of his services as head of the photographic section of the Royal Naval Air Service, Mr. R. B. Fishenden has been deputising.

Imperial War Photographs in Colour.—In our notice last week of the exhibition of official war photographs now open at the Grafton Galleries it should have been mentioned that the whole of the enlargements constituting the exhibition are the production of Messrs. Raines and Co., of Ealing. Messrs. Raines intimate that while the chief part of the process employed in the work is that of aerograph colouring of sepia-toned prints, other auxiliaries to the air-brush work have been employed. The references in some of the daily newspapers to the exhibition as a demonstration of colour photography may, perhaps, be taken as a compliment by Messrs. Raines, but it should, of course, have been clear, even to the lay writer, that the exhibits are coloured photographs, and have nothing in common with the processes which are ordinarily classed as colour photography. Even when the lay writer is at pains to lay emphasis upon the distinction, he is sometimes guilty of a technical howler, as in the case of a Scottish newspaper which solemnly informs its readers that in the colouring of the prints "the pigment is sprayed on the bromide print in the course of printing"—one of those photographic operations which one would like to see illustrated.

The National Portrait Gallery.—In the House of Commons on March 7, Mr. Bowerman asked the Secretary to the Treasury if he is aware that the trustees of the National Portrait Gallery purpose commemorating, by a series of permanent photographs, the features of distinguished living contemporaries of British nationality, including all persons, naval, military, or civilian, who, during the war, have rendered service to their country by their valour or by the promotion of the Empire welfare; whether he is aware that for this purpose the trustees have given one firm of photographers a monopoly; and whether, in view of the national character of the proposed memorial, the trustees will consider the desirability of including photographs other than those to be taken by the firm so chosen?—Mr. Baldwin: The answer to the first part of the question is in the affirmative; to the second, that the employment of a particular firm for this purpose is not a monopoly, since photographs by other photographers are accepted under certain conditions; and to the third, that the trustees have always accepted photographs taken by any photographer of persons living or deceased who have the slightest claim to distinction in any sphere of life. In no circumstances are photographs taken from life exhibited in the Galleries; they are acquired solely for reference purposes.

New Military Prohibition of Photography.—The order which came into force last week provides that no person without special permission may make any photograph, sketch, plan, model, or other representation of any place or thing within the following areas:—

Metropolitan Police District.—All places (except urban districts of Erith and Bexley and parish of Crayford) which are outside a radius of twelve miles from Charing Cross Railway Station.

Essex.—Municipal borough of Chelmsford; urban districts of Epping, Romford, Brentwood, and Grays; parts of rural districts of Epping and Romford not included in Metropolitan Police District, rural districts of Ongar and Billericay, and part of rural district of Orsett, not included in Thames and Medway area; parishes of Roxwell, Writtle, Witford, Ingatestone and Fryering, Margaretting Stock, Buttsbury, Great Baddow, West Hanningfield, South Hanningfield, Runwell, Rawreth, Rayleigh, Thundersley, South Benfleet, Hadleigh, and Canvey Island.

Kent.—Urban districts of Dartford, Sevenoaks, and Wrotham; rural districts of Dartford (except parish of Crayford), part of rural district of Bromley not included in Metropolitan Police District, and rural district of Malling (except parishes of East Peckham, Wouldham, Burham, Aylesford, and Allington); parishes of Halstead, Shoreham, Westerham, Brasted, Sundridge, Chevening, Dunton Green, Riverhead, Sevenoaks, Weald, Otford, Kemsing, and Seal.

Surrey.—Urban districts of Leatherhead and Caterham; parishes of Ashtead, Headley, Mickleham, Walton-on-the-Hill, Kingswood, Chipstead, Gatton, Merstham, and Chalden; and part of rural district of Godstone lying north of Redhill and Tonbridge branch of South-Eastern and Chatham Railway.

Within the Metropolitan area the regulations prohibiting the photographing, etc., of objects of military interest and importance, of course, still hold good.

Persons who desire permission, however, will have no difficulty in obtaining it, either to make sketches or take photographs, on applying to Headquarters, London District, Horse Guards Annexe, 12, Carlton House Terrace, W.C.2.

Hardening Agents and Gelatine.—Equivalent amounts of potash alum and aluminium sulphate exert the same hardening action on gelatine, two parts by weight of aluminium sulphate being equivalent to three parts by weight of potash alum. Commercially pure aluminium sulphate is satisfactory if this does not contain too much iron, though if the sample is at all acid the solution should be neutralised by adding ammonia until a faint permanent precipitate is obtained. When mixing the usual liquid hardener formula with commercial aluminium sulphate a slight milky suspension is formed, but this is harmless and settles out on standing.

The hardening action of potash and ammonium alum on gelatine has been measured by comparing the degree of swelling and the change in melting-point of gelatine films treated with solutions of the two salts. No difference was observed between ammonium alum and potash alum in their hardening action when substituted weight for weight in the usual hardening formula. In practice, if any difference in hardening action occurs, this is due to the use of an impure ammonium alum, in which case, providing the impurities are harmless, an increased amount of ammonium alum should be used to such an extent that its content of aluminium sulphate is the same as that in the potash alum called for by the particular formula. When using ammonium alum, if the fixing bath becomes alkaline by virtue of a neutralisation of the acid by the developer carried over, ammonia will be liberated, resulting in the production of dichroic fog and stain. No trouble will be experienced, however, if care be taken to keep the bath acid.—Eastman Kodak Laboratory Reports, 443 and 444.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

⁂ *We do not undertake responsibility for the opinions expressed by our correspondents.*

DEVELOPER FOR PROCESS WORK.

To the Editors.

Gentlemen,—I cannot allow Mr. Pfenninger's letter to pass without comment. He states that the substitute for acetic acid and methylated spirit which I gave in the "B.J.," November 30, 1917, has been found wanting in his hands. I can only say that at Bolt Court School, and in several trade houses, it works quite well. Sometimes the gelatine becomes slightly coagulated, and then the bottle requires shaking. May I point out that the developer suggested by Mr. Pfenninger contains acetic acid, and it is the use of this substance which is the present difficulty.—Yours faithfully,

W. J. Smith.

L.C.C. School of Photo-Engraving, Bolt Court, Fleet Street, E.C.

SOFT WATER AND BLISTERS.

To the Editors.

Gentlemen,—Your paragraph in this week's issue on the relative action of a hard and soft water supply in causing blisters on bromide prints interested me, as my experience fully substantiates your theory. Living in North Wales, where the water supply—derived from one of the Welsh lakes—was extremely soft, I was very much troubled with blisters in sulphide sepia toning. The least variation in temperature during this process covered the prints with minute blisters, and with the most careful attention it was difficult to escape without some. Two years ago I removed to Lancashire, and the town supply of water is just the reverse—extremely hard. During this time—winter and summer, hot and cold weather—I have toned, on an average, fifty dozen postcards daily, and I have not had a single blister. I have not the least hesitation in attributing this to the harder water.—Yours faithfully, H. I. E.

THE COVERING POWER OF A LENS.

To the Editors.

Gentlemen,—I think that a protest should be made against the proposition that has been put forward in recent issues of the "British Journal of Photography" that the phrase "covering power" of a lens should be taken to refer to some degree of definition, and not to the area illuminated.

There are two objections to such a limitation of the meaning of "covering power." The first objection (quite sufficient in itself) is that it is not in accordance with fact. A lens covers an area on which it throws an image which can be registered on a photographic plate. That is the fact. To say that it only covers a field over which it yields an unspecified degree of definition is absurd. Anyone using the word "cover" with respect to definition should at least be bound to specify the fineness of definition implied, and then that degree of definition should be such as receives general acceptance. Failure to comply with these conditions constitutes the second objection.

The only excuse that I can see offered for the use of the words "covering power" with regard to definition instead of to illumination, is that some makers have so used it. But I am not aware that there was any agreement as to what degree of definition was implied. Probably sufficient, or satisfactory, definition was intended. But what is satisfactory to one person is quite unsatisfactory to another. In the early days of Daguerreotype and collodion, when Voigtlander's and Ross's lenses were recognised as being of the highest quality (I don't wish to imply that they are not so now), a lens of about 11½ in focus and 3¼ in diameter was classed by Voigtlander as whole plate, and many very satisfactory whole plates have been made with it, whilst a lens of similar diameter and focal length was marked as half-plate in Ross's catalogue.

It is very doubtful if any generally acceptable standard of definition could be found. If either of the standards be taken based on the size of the circle of confusion, the 100th of an inch in England and the tenth of a millimetre (about the 250th of an inch) in France, given with the tables professing to state the distance beyond which all objects are in focus, a lens like the Bergheim could not be said to cover a plate of any dimensions whatever, which again is absurd, as it actually covers, and presumably to the satisfaction of the user, quite a large plate.

To come back to the basic fact. A lens covers an area over which it produces a photographic image.—Yours faithfully,

March 11. W. E. Debenham.

HYPO RECOVERY.

To the Editors.

Gentlemen,—Perhaps you will be kind enough to let me trespass on your space in order to reply to Mr. Welborne Piper's criticism of my letter on the subject of "hypo" recovery. I gather from Mr. Piper's remarks that he considers that the increase of fixing power of my hypo is simply due to the formation of an ammonia compound with the residual hypo, and that the hypo is not recoverable because it no longer exists as a thiosulphate. I entirely disagree with Mr. Piper in both these conclusions for the following reasons:—

1. If a solution of a haloid salt of silver (bromide or chloride) is made in hypo until the latter is completely saturated, and then is treated as I described, the hypo regains its fixing qualities. Further, the solution responds to all the usual tests for thiosulphates, and its iodine equivalent is almost exactly equal to that of the original hypo solution.

2. If the silver is simply precipitated as the sulphide, and no ammonia is used, its fixing power is again restored, although not to the same extent as when the ammonia is added.

3. When ammonia is added to such a solution and no precipitation of the silver is resorted to, it seems to have very little effect upon its fixing qualities.

I think Mr. Piper will find that modern chemists are agreed that when a silver haloid is dissolved in hypo a double thiosulphate of silver and sodium is formed. If sulphuretted hydrogen is added to this double salt, silver is precipitated, and a corresponding amount of the acid radicle is liberated. This, being unstable, at once splits up into sulphur and sulphur dioxide. My object in adding ammonia was to replace the precipitated silver, and thus avoid decomposition. Probably sodium hydrate would be better, but it is difficult to estimate the exact quantity required, and any excess would form sodium sulphide.

I am still experimenting, and although I have separated the final product of my process, I have had no time completely to ascertain its composition, except so far as to prove that it is certainly a thiosulphate.

I am looking forward with great interest to the publication of the results of Mr. Piper's experiments, for even if his results are negative ones, as I gather from his letter that they are, they may help someone else in elucidating the problem.—Yours faithfully,

L. F. E. Johnson.

9, Highbury Grange, London, N., March 11.

TANK DEVELOPMENT.

To the Editors.

Gentlemen,—There seems to be a great diversity of opinion as to the merits or demerits of the tank in development, and I should be glad to know the opinions of brother "pros." as to their experiences. Personally, I have used it for a long time past, and have given it a good test, and am in favour of it, but I have met several that are just the other way against it. Mr. H. Essenhigh Corke, in this town, is in favour of it, I know, and I am indebted to him for several hints that have been of use in many ways. But, as I have said, there seems to be a great difference of opinion, and I should like to hear the views of others if they will write to the "B.J." and you will be kind enough to publish them, as we are none of us too old to learn—at least, I am not, I know. I am quite satisfied that it is a great time saver, as, previous to adopting it, I spent many hours developing plates, and the time is now put in in doing other things while plates are developing. Now, by that I do not mean that I put my plates into the tank and remove them at the end of a period of time, no matter what the result. I put them into the tank, carefully noting the time, and at the end of the first few minutes—say, five—I go and turn the plates over, not the tank, which I could easily do, as I use a small one, and so on till they are finished or till I have got the result that I want. I use Johnson's "Azol," as I find that I can get on better with that than pyro., and I do not throw away the developer after each batch, but put it by till next wanted, then bring it up to the capacity of the tank, which is 30 oz. in a ½ pl., and add 1 dr. Azol, and go again. I find that this works quite well, as I think it is better as the developer gets "riper," shall we say? I might add that I always note the temperature with a thermometer before I begin, as I do not think that it seems to work as well if it is hotter than 70. Another thing: I mix the developer in a measure, and if you add fresh from stock see that it mixes well with the old; not add a little to the tank just before the plates are put in, or you will have trouble with marked plates. Another tip—one to which I am indebted to Mr. Corke—put sufficient developer into the tank to cover the first pair of plates. As the tank that I use will take a pair of plates back to back, placing the tank into a fairly deep dish, I drop each pair of plates into their grooves, until all are in. Do not put your plates into tank first, then pour on the developer, or you will have a splendid crop of air bells. The reason for the dish is obvious, as developer will flow over, and would be otherwise lost if the tank was stood in the sink. No doubt a good many will say that it is not much save of time if you turn over the plates at the end of five minutes, but, if you think, you can stick on a good many tissues, for instance, in five minutes, and if you run a one-man show, as I do, these five minutes are of value. Of course, when your plates are developed you will put them into the hypo. Do not by any chance get your tanks near the fixer; have another tank quite away. I use a wooden one and a separate rack, which does not get near the developer by any chance. I think that I have explained my method of working, and I have no doubt that I shall be told that it is all very well for me using a small tank, as I have only a small quantity of plates, but I have several, and I frequently have them all going at the time, and if I find that I have sufficient exposed plates to fill the tank in a brief interval, I start the tank going in the middle of the day; but—a warning—do not go away and forget it, and then blame the tank. Of course, it is best, if possible, to expose the plates accurately, but I think that I err on the side of full, rather than under, myself.—Yours faithfully,

W. Brunton.

Sevenoaks.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

L. and Co.—It is most likely that the balsam has deteriorated. If you will send the lens to us we would report on it. If the surfaces require repolishing, we are afraid you will have to wait until after the war, since few opticians can undertake any photographic work at present.

H. G. R.—There is no objection to fixing prints developed by metol and amidol in the same bath. As a matter of fact, we have fixed prints made by different developers simultaneously. 2. You should use varnish or medium on uranium intensified prints to protect them from the atmosphere; try gently rubbing with a little turpentine to remove the tarnish and then varnish. 3. We do not think the price too high for the enlargements of good quality.

H. T. B.—The list price of the Dallmeyer 4B lens is £38; that of the Busch No. 3 lens, £3 3s.; and the No. 4 lens, £4 4s. You should get from one-half to two-thirds these prices. You can either sell them by auction at Stevens's Auction Rooms, King Street, Covent Garden, where there is a photographic apparatus sale every Friday, or you can advertise them in the columns of the "B.J.," in which case you can avail yourself of our deposit system.

Lens for Large Head.—In my studio, which is 22 ft. by 15 ft., I use a triple extension half-plate camera with an 8 in. focus, by which I get suitable photographs for P.C. and half-plate, but I want to be able to take larger heads. What focus would you recommend? I thought of having a R.R. of about 12 in. or 14 in. focus. Would this be suitable?—F. N.

Presuming your camera has an extension of 20 in., you can use a 12-in. lens for a head half size or any lesser scale of reproduction. Apparently this is as long a focus as your camera will take, and it is a fairly decent length of focus for large heads.

Focal Length and Aperture.—I have recently purchased several second-hand lenses. As far as I can see by actual trial, there appears to be some alteration of focus with each stop used, so that when focussing at, say, $f/16$, on altering to $f/22$, the focus changes also, and so on for every different stop. Could you inform me if there is any optical rule or equation relating to focus and nodal points which would give me, by calculation, the amount of alteration required as a definite quantity, so that the lens mount could be marked with the difference, and so save the continuous trouble of refocussing?—H. Lees.

This sometimes occurs, but we would not have expected it to have any serious effect with the lenses you mention. It is direct aberration, and there is no rule by which you can calculate the variation. Nothing but trial will enable you to make the desired correction. The usual remedy is to focus with the stop that is to be used.

Blue-Print Paper.—I have twenty rolls of ferro-prussiate paper for printing from tracings, but it is apparently old stock. With ordinary methods, a minute's printing in sun, then treated in water bath, no results are obtainable; but by printing for fifteen minutes dark-blue lines appear on a pale-green ground. This would not do for purpose required. Is there any solution I could fix them in so that this image would remain fairly permanent? I have tried development with potass-ferricyanide and fixing in sulphuric acid, but results are not satisfactory. As a professional who values your kindly advice, I should be pleased if you could guide me in this matter.—"Ferro-Prussiate."

We are afraid that the paper has gone too far for any treatment to be effective. If you cannot replace it, you might utilise it by sensitising the back, which you can easily do with a sponge, if you have no dishes large enough. A simple formula is:—

A.	Ferric ammonium citrate	400 grs.
	Water	5 ozs.
B.	Potass ferricyanide	300 grs.
	Water	5 ozs.

Mix, filter, and keep in the dark. The paper will keep better if ½ gr. of potass bichromate is added to each ounce of mixed solution.

Acid Fixing Bath, etc.—1. We have been using acetic acid in fixing baths, but cannot get it any longer. Will sulphuric acid do in its place? 2. Can you tell us of anything that will take the place of methylated spirits for cleaning cards, etc.? 3. Can you give formula for making a glass roof dull, instead of using tissue paper for keeping sun out?

1. You can use sulphuric acid in the following way:—

Add—

Strong sulphuric acid	2 dr. fl.
Water	2 ozs.

to—

Sodium sulphite	2 ozs.
Water	6 ozs.

And pour the mixture into—

Hypo	16 ozs.
Water	48 ozs.

Finally add to the above mixture—

Chrome alum	1 oz.
Water	8 ozs.

2. Petrol or benzol will answer, or a weak ferricyanide and hypo reducer may be applied with cotton-wool before the final washing.

3. Zinc white ground in oil and thinned with turpentine, stippled on with a nearly dry brush, or ordinary starch as used for mounting mixed with common whiting.

The British Journal of Photography.

The Oldest Photographic Journal in the World.

PUBLISHED EVERY FRIDAY. Established 1854. **PRICE TWOPENCE.**

Net Prepaid Line Advertisements.

THE ADVERTISEMENTS ARE CLASSIFIED AS FOLLOWS:

Situations Vacant.
Assistants Wanting Situations.
Photo-Businesses.
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Materials. Sundry goods, papers and postcards, mounts, etc.
Service. Printing, retouching, enlarging, etc.
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Books.

PRICE.
18 WORDS
1/-
(MINIMUM).
Extra words—3 (or less) 2d.
No reduction for a Series.
Forwarding Fee, 6d.

⁂ Those wishing to have their Advertisements addressed to initial letters, c/o British Journal Office, may do so by remitting 6d. extra per insertion, each advertisement, for forwarding replies; but no charge is made if letters are called for.

ALL ADVERTISEMENTS must be accompanied with a full remittance. Cheques and Postal Orders should be crossed "   & Co.," and made payable to Henry Greenwood & Co., Ltd.

DEPOSIT SYSTEM.—When selling goods to strangers, or purchasing, all risk is avoided by employing our deposit system. Cost is trifling. The purchase-money must be deposited with the publishers, Henry Greenwood & Co., Ltd., 24, Wellington Street, W.C. 2, and all Cheques, Money Orders, &c., made payable to them. Acknowledgment is sent to both parties and deposit is held until receipt of advice that goods have been received and found satisfactory, in which case the amount deposited is forwarded to the seller, less a commission of 2½ per cent. (minimum, one shilling; maximum two shillings and sixpence). If goods are not approved the publishers wait original owner's acknowledgment of their safe return before refunding the deposit. In this case the minimum commission only (one shilling) is deducted. All disputes or questions arising from such causes as damage of goods in transit, &c., must be settled between the contracting parties. The deposit is held by Messrs. Greenwood pending settlement. Messrs. Greenwood do not undertake to express any opinion on the condition or value of goods, nor must the goods be sent to them.

NOTICE.—The latest time for receiving small line advertisements is 2 o'clock p.m. on Wednesday for the current week's issue.

Displayed Advertisements should reach the Publishers Monday Morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed

⁂ To prevent delay communications relating to Advertisements and general business affairs should be addressed to the publishers. All advertisements are received subject to their approval or revision, and the right is reserved to refuse any advertisement without giving a reason for so doing.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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SUMMARY.

Will senders of line advertisements kindly give a careful reading to the paragraph on this page and to the notice printed at the foot of page 144.

The third portion of the Traill Taylor Lecture by Mr. C. H. Bothamley deals with methods of intensifying and toning with uranium. Mr. Bothamley, in his analysis of the process, points out the practical advantages of conducting it in two steps, or even in three. In the latter case ferricyanide itself can be dispensed with, the print or plate being first bleached to a silver chloride image, treated with ferrocyanide and subsequently with uranium bromide for red-brown tones, or with ferric chloride for blue tones. (P. 135.)

At the annual general meeting of the Professional Photographers' Association Mr. H. A. Llewellyn Chapman was formally elected President. The Treasurer reported that the number of subscriptions collected (883) was the largest received in one year since the existence of the Association. Another announcement was that the action of the P.P.A. had resulted in the discontinuance of the supply of photographs to the Press by the Royal Flying Corps. (P. 137.)

A very effective form of washing tank for prints is described and illustrated in "Assistants' Notes." Prints are constantly turned over by hand, but the triple construction of the tank economises water and facilitates the systematic transfer of prints from one wash-water to another. (P. 140.)

Messrs. Johnson and Sons' Smelting Works Ltd., write pointing out that in their experience liver of sulphur is uniformly effective in throwing down the whole of the silver from spent fixing baths of various descriptions. (P. 143.)

An instance of the disappearance of the blister trouble, consequent upon the artificial hardening of the water-supply, is cited by a correspondent. (P. 143.)

A handsome volume dealing with the development and present resources of the British photographic industry has been prepared by the British Photographic Manufacturers' Association for the information of important buyers and importers within the British Empire and in foreign countries. (P. 138.)

It is officially announced that the prohibition of the export of photographic plates and papers from France to Allied or neutral countries has been withdrawn except as regards Switzerland. (P. 142.)

A correspondent disputes the utility and, indeed, the possibility of adopting the meaning for the term "covering power" as applied to a lens suggested last week by Mr. W. E. Debenham. (P. 143.)

EX CATHEDRA.

Prepaid Line Advertisements. We must ask senders of line advertisements for insertion in the "British Journal" to note particularly the following items. Some of them are fresh war-time provisions, necessitated by the depletion of our publishers' staff. Others are of long standing, but are so often neglected by advertisers that we would impress upon these latter the great amount of clerical work which is caused by their insufficient attention to the charges and conditions on which prepaid line advertisements are inserted.

> Advertisements must now be fully and correctly prepaid, otherwise they cannot be inserted.
>
> The charge is 1s. for 18 words or less; 2d. for every additional 3 words or less.
>
> In the case of announcements under a box number, the box number and our publishers' address must be reckoned as six words, and a remittance of 4d. (in addition to the charge for the bare announcement) made to cover them.
>
> In no circumstances can advertisements be repeated from previous issues unless the announcement, as previously printed, is sent with the order and the full remittance.
>
> Advertisers are urged to post their announcements whenever possible on Monday for publication on Friday. Postal deliveries being now very often irregular, the ordinary normal day (Wednesday) for the receipt of line advertisements now generally throws such an amount of work upon both our publishers' staff and our printers that the earliest possible posting is a necessity for appearance on the following Friday.
>
> Small prepaid advertisements will be accepted up to noon on Wednesdays, instead of 2 p.m., as hitherto, but their insertion is conditional upon space being available. Usually at this eleventh hour it is difficult to allocate space.
>
> Any notice of cancellation of a line advertisement or of alteration in it must come to hand at the latest on Tuesday.
>
> No advertisements can be accepted on the telephone.

If the senders of prepaid advertisements will give the above the briefest consideration, they will perhaps realise that they are necessitated by the circumstances of the time. A depleted staff cannot now, as hitherto, undertake to make a separate and subsequent application to advertisers for the balance of money which they have failed to remit. As regards repeat advertisements, senders must understand that their omission to supply the announcement previously printed entails a search among hundreds of advertisements with an expenditure of labour which is not now possible. The receipt of advertisements on Wednesday instead of on Tuesday morning makes all the difference in dealing with them at this office, and in getting them accurately set up in type by the printers. We do not now accept any responsibility for printers' errors in advertisements, but advertisers have this matter largely in their own hands, and can contribute to accurate publication of their announcements by posting them on Monday. The alteration from 2 p.m. to noon on Wednesdays (for a limited number of advertisements) has been made in view of the fact that the offices of the "Journal" are now closed from 1 to 2 p.m., and that therefore the later hour, previously in force, actually became 2.30 or 3 o'clock.

* * *

Cold Hypo-Alum. The use of the bath of alum and hyposulphite at a temperature round about 100° has become standard practice in this system of toning to such a degree that it is not uncommon to meet photographers who are unaware that the process can be worked in the cold. In ordinary circumstances there is not much to be said for this variation, although it would seem to be practised to a fair extent in the United States. Here its slowness has condemned it in the eyes of commercial photo-printers, and surely our American friends are not less exacting in this respect. Without seeking to find a solution for this discrepancy of opinion, it may be pointed out with greater prominence than the brief reference in a recent "Assistant's Note" that the cold process at times may save the situation when dealing with paper which repels all the ordinary anti-blister prescriptions. Instances occasionally come before us where fixing-hardening baths and the like prove ineffective in preventing blistering in the hot hypo-alum. In such cases, particularly if the work is strip-printed and ample dish accommodation is available, the cold bath will often make an end of the trouble.

* * *

More About Lead Glass. The way students are too often misled by "authorities" is aptly illustrated by a quite up-to-date instance. Recently in an "Ex Cathedra" note on chemical glass we referred to a paper read at the Society of Glass Technology, wherein, as the result of experiments, the authors claimed that lead glass showed greater resistance to boiling acids than any modern chemical glass. Almost simultaneously a text-book on glass appears in which it is stated positively that heavy lead glass is attacked readily by mineral acids. We have no doubt as to which statement seems most likely to be incorrect, and that is the second one, but in a case like this how is the student, without experience, going to get an idea with regard to the facts? Books, especially those of the text-book variety, carry much weight in the mind of a student, who takes some time to realise that people who write books are not necessarily always correct. A piece of careful research, backed by experiments, will outweigh any book statement in the mind of the more experienced, but the student is confused, and his progress is much delayed, by contradictory statements on matters of which he has little personal knowledge.

* * *

Research in General. We hear so much about research, and scientific research especially, in these days that it is to be feared that many will be deterred from supporting research generally from a mistaken idea of what it really means. In the popular mind scientific research is associated with the laborious efforts of some dry-as-dust philosopher to produce sugar from coal, or to effect some similar magical change of problematical value. This idea is not encouraging, and as science and scientific are words so much misunderstood by people in general, it might be better to use them rather less freely. In point of fact research is merely self-study, which takes us a little outside the limited domain that can alone be covered by books and teachers, and so enables us to make real progress. Further, this self-study helps to expose ancient stereotyped errors of which there are many in all branches of knowledge. There is indeed no subject in the world in which research is not possible and desirable, or in which it is not essential to the individual who desires to succeed. Years ago one of our most valued and respected instructors had one invariable answer to every pupil who asked for information, which answer was, "Find out for yourself," and until that pupil had fairly exhausted himself in the endeavour to find out, not a scrap of help would he get. That is the whole essence of research, finding out for oneself, and the practical, as well as the moral, value of such training and experience must be evident. The methods of the researcher must be scientific, inasmuch as they must be orderly and adopted with definite intent, but the subject of his research may be quite unconnected with any branch of what is called "science" at all. He may be a business man pure and simple, a book-keeper, a shopkeeper, or an artist. Whatever his occupation may be research is possible, and, more than that, it is essential to his success.

PERSULPHATE REDUCTION, CHROMIUM INTENSIFICATION AND URANIUM TONING.

The twentieth Traill-Taylor lecture delivered last year by Mr. C. H. Bothamley, but only quite recently published, takes the form of a review, of what the author calls "Minor Processes of Photography." These processes are:—Reduction with persulphate, intensification with chromium, and toning or intensification with uranium. The last of these is almost an obsolete process, but, still, it is one of which it is well to be reminded, for, if further investigation can take away some of its inherent defects, it is a process well worth reviving. There is probably no other bromide toning process capable of giving such fine effects. The other two processes are, however, of very considerable immediate practical importance, and are not likely to be superseded; therefore, we feel it very advisable to correct one or two statements of Mr. Bothamley's which are likely to give a false impression, even though criticism of a Traill-Taylor lecture may appear to savour of sacrilege.

The first subject treated is reduction with persulphate, and the use of potassium persulphate is deprecated on the curious grounds that a stronger solution than 2 in 100 cannot be made at ordinary temperatures. Why this should be a valid objection we are quite unable to understand, seeing that a 2 per cent. solution is far too strong for use. One per cent is as vigorous as any one can possibly desire, a weaker solution still is advisable. Ordinarily we use a saturated solution diluted with an equal quantity of water, and within the past few days such a solution has been giving perfect satisfaction at a temperature of only 50 degrees F., at which it is quite impossible to make a 2 per cent. solution at all. This solution was probably of not more than $\frac{3}{4}$ per cent. strength, perhaps less, but was of full vigour. We invariably find a half-saturated solution, with one drop of strong sulphuric acid to every 4 ounces, a most satisfactory and reliable reducer, and, certainly, both more convenient and dependable than one of the ammonium salt.

A somewhat debatable point is Mr. Bothamley's contention that the milkiness seen in the persulphate solution is necessarily due to chloride. It may be due partly to chloride, and, in fact, there is no doubt that silver chloride is frequently formed, but the chloride is practically insoluble in persulphate, whereas a great deal of the milkiness frequently observed is soluble, appearing only when the solution is in use, and disappearing when the plate is removed from it. Mr. Dodgson has shown that in the course of reduction, silver sulphate, silver persulphate, silver peroxide, and silver oxide are formed in succession, and the appearance of, and disappearance of, the milkiness may indicate the course of some of these changes. The older idea that it is chiefly sulphate in excess strikes us as more likely than the suggestion that it is always chloride. The conditions under which milkiness appears are somewhat indefinite, but it seems that it is favoured by using a solution that has already done a great deal of work, and is therefore loaded with silver.

A review of the process of reduction with persulphate should certainly contain some reference to Mr. Dodgson's important investigations, which were published in "The Photographic Journal" for July and September, 1911, while the use of a sulphite fixing-bath after the operation of reduction also seems worth mention.

The second subject dealt with is chromium intensification, and here Mr. Bothamley does not seem to be fully acquainted with the work of Carnegie and Piper. This is apparent from the fact that he gives references to only two out of the five instalments of their 1905 paper, and misses several important matters dealt with in the other three.* He says they suggested that the chromium compound might be chromic chromate. As a matter of fact, they stated in the 1905 article that they had abandoned the idea of its being chromic chromate, as an extensive series of comparative tests showed that it bore a much closer resemblance to the compound Cr_5O_9, which is probably a complex of chromic and chromous compounds.

In the same article these two investigators also considered the nature of the silver chloride compound formed, and that of the active constituent of the bleaching solution, which latter they considered to be potassium chlorochromate. Seeing that a simple solution of this compound is now very commonly used as the bleacher, it seems probable that this conjecture was correct.

Mr. Bothamley seems to misunderstand Mr. Cunningham's paper, to what he refers. Mr. Cunningham, so far as we can see, referred only to the increase in size of grain produced by the addition of chromium (which he illustrated admirably), and not at all to the increase due merely to the redevelopment of silver chloride grains. This latter factor of intensification was considered by Carnegie and Piper, but not mentioned by Mr. Cunningham in his paper.

In the section on uranium toning, Mr. Bothamley has done useful work in reviving some old methods and expedients in danger of being forgotten, but he has omitted all reference to sulphocyanide, either as an ingredient in the toning solution or as an after "fixing" bath. This was, however, a most valuable auxiliary and much used, while time has shown that its effects were very beneficial. The hypo bath that he mentions as a fixer was a practical failure, as, while it undoubtedly removed the soluble silver salts, it ruined the tone of the image. The hypo bath gave a crude red colour that was intolerable, while the sulphocyanide gave a very pleasing tone, and was just as effective in other respects.

SOME MINOR PROCESSES OF PHOTOGRAPHY.

(The Twentieth Traill Taylor Memorial Lecture delivered before the Royal Photographic Society by C. H. Bothamley, M.Sc., F.I.C.)

(Continued from page 124.)

Intensifying and Toning with Ferricyanides.

The uranium and ferricyanide method of intensifying negatives and toning prints and lantern slides is well known. Solutions of uranium nitrate (2 in 100) and potassium ferricyanide ([illegible] in 100) are mixed in equal volumes and acidified with acetic acid. The mixture is poured over the carefully fixed and washed negative or positive and brown-red ferricyanide is gradually deposited on the image, the silver being converted more or less completely into silver ferrocyanide. The chief practical drawback to the process as thus carried out is the tendency for the brown-red compound to deposit on the whites of the print or the shadows of the negative, instead of on the image alone, a fact which, together with doubts as to the permanence of the brown-red image, has led to the disuse of the process. This result is unfortunate, because if the process can be carried out without staining the shadows of the negatives, it has great value as a method of intensification, especially with very thin negatives, as Eder pointed out emphatically long ago. Similarly, if staining of the whites can be avoided, the process provides a simple means of imparting to bromide prints and lantern slides a colour which is well suited to certain subjects, but is not readily obtained in any other way. Further, the ferricyanide process is capable of numerous modifications which yield a variety of colours suited to special purposes. (Namias, "Über die Tonung mit Ferrocyanverbindungen zur Erlangung von Bildern in verschiedenen Tonen auf Bromsilberpapieren und von Diapositiven."—Eder's Jahrbuch." 1908.)

Sixteen years ago, however, L. Bune pointed a way out of the difficulty ("Bull. de l'Assoc. Belge," 1901, 627-629). He recommended carrying out the process in two successive operations instead of with mixed solutions. The well-washed print is immersed in a solution of potassium ferricyanide (2 to 5 in 100) until bleached, and is then well washed. The bleached image is not affected by uranium nitrate solution, but if immersed in uranium chloride solution (1 in 100), or in a solution containing uranium nitrate 1, common salt 20, water 100, the image gradually changes to warm sepia, the whites remaining unstained. The modified process was described as applicable to the toning of positive images, and it was not suggested that the same method should be followed when intensifying negatives. It is remarkable, however, that this valuable suggestion would seem to have been entirely neglected, although I called attention to it at the meeting of the Photographic Convention in 1906.

In 1905 L. J. Bunel[4] ("Bull. Soc. Franc." [2] XIX., 303) advocated the use of citric acid (2.5 in 100) or oxalic acid (1.5 in 100) in place of acetic acid, on the ground that they prevent deposit elsewhere than on the image. He attributed the general staining to the formation of an unstable uranium ferricyanide, and stated that if a considerable quantity of salt is dissolved with the uranium nitrate, or if uranium chloride is used instead of the nitrate, the formation of the unstable ferricyanide is prevented and staining is avoided. The paper also refers to the method of toning positives in two stages. (See above.)

Before dealing with the process itself, it is advisable to clear up one or two points concerning the chemical reactions involved. It is well known that when a solution of a silver salt is slowly added to a mixture of salts, with the acid radicles of which it forms insoluble salts (precipitates), the silver may combine preferentially with one of the radicles before combining with the others. If the liquid contains iodides, bromides, and chlorides, for example, the precipitate at first consists of silver iodide alone, later of silver bromide, and lastly of silver chloride. Similarly, if silver chloride is treated with an alkali bromide, it is converted into silver bromide, and if silver bromide is treated with an alkali iodide, it is converted into silver iodide. It has lately been stated that silver chloride is converted into silver ferrocyanide when treated with potassium ferrocyanide solution, whereas silver bromide and silver iodide remain unaltered when treated in the same way, and these facts have been utilised in a method for detecting chlorides in a mixture of chlorides, bromides, and iodides.

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* The full 1905 references are: "The Amateur Photographer" for June 6, 13, 20, 27, and July 4, 1905.

(4) A comparison of this paper with that just referred to suggests that there is some mistake in the names, and L. Bune and L. J. Bunel may be one and the same person.

I have verified these statements, using carefully purified potassium ferrocyanide.

The position of the ferricyanides in this series has to be considered. By adding a solution of a silver salt to solutions containing (*a*) ferrocyanide and ferricyanide, (*b*) ferricyanide and chloride, and by treating (*c*) silver ferricyanide with a solution of a ferrocyanide, (*d*) silver ferrocyanide with a solution of a chloride, (*e*) silver chloride with a solution of a ferricyanide, and (*f*) silver ferrocyanide with a solution of a ferricyanide, it is easy to show that—

(1) Silver forms the ferrocyanide in preference to the ferricyanide.

(2) Silver forms the chloride in preference to the ferricyanide.

Combining now the known results, we get the following order of preferential formation of silver compounds:—

Sulphide, iodide, bromide, ferrocyanide, chloride, ferricyanide.

That is to say, silver will form silver sulphide in preference to any of the others; iodide in preference to any of those following it; and so it will form any of the other compounds in preference to forming ferricyanide. The practical application of these facts will become clearer later on.

Returning now to the uranium process, it seemed worth while to ascertain how far the precipitation of uranium ferrocyanide which causes the staining (*a*) depends on the uranium salt used; (*b*) is affected by light.

Using very pure samples of uranium salts and of potassium ferricyanide, I found that if the solutions are mixed in the dark and kept in the dark, there is still some precipitation of uranium ferrocyanide, which is not prevented by addition of acetic acid. Exposure to diffused daylight distinctly increases the amount of precipitate formed. There is no distinct difference in behaviour between uranium nitrate, chloride, and acetate.

Potassium ferricyanide quite free from ferrocyanide and chloride readily bleaches a negative image which has been washed free of soluble chlorides. With a solution of 5 parts in 100 the action is fairly rapid. The bleached image consists of silver ferrocyanide, with possibly some silver-potassium ferrocyanide. I could obtain no evidence that the image contains any ferricyanide, as Bunel suggested.

If, now, the bleached and well-washed negative is immersed in a solution of uranium nitrate or acetate free from chloride, there is no change, but if immersed in a solution of uranium chloride, or a solution of the nitrate or acetate to which a fairly large proportion of sodium chloride has been added, the white image gradually changes to brown, as Bunel stated, and there is no staining of the shadows of the negatives or the whites of the print, as the case may be. The action of the uranium solution is somewhat slow.

I find that the action is much more rapid and the colour of the image is brighter and redder if the solution of uranium nitrate is mixed with potassium bromide, instead of with a chloride, but great care must be used to avoid adding any excess of bromide, because whilst a moderate excess of chloride does no harm, since it does not decompose the silver ferrocyanide which forms the image (see above), an excess of bromide may spoil the result, since the bromide will then change some of the silver ferrocyanide into silver bromide before the uranium salt has time to act on it. If both compounds are quite pure and dry, 100 parts of uranium nitrate require 47.4 parts of potassium bromide, but it is advisable to use a lower proportion. Useful solutions are:—

A.	Potassium ferricyanide	5 parts or 350 grains.
	Water	100 parts or 16 oz.
B.	Uranium nitrate	5 parts or 350 grains.
	Potassium bromide	2 parts or 140 grains.
	Water	100 parts or 16 oz.

If the purity of the uranium nitrate is doubtful it is wiser to use only 1½ parts (or 100 grains) of potassium bromide.

The thoroughly fixed and washed negative, print, or lantern slide, is immersed in A until bleached. It is then thoroughly washed—a matter of great importance—and immersed in B until no further change takes place. The intensified or toned image is washed in several changes of water, *slightly* acidified with acetic acid if the water is hard, and finally in three or four changes of water as soft as is procurable.

[The specimens exhibited not only showed absence of staining of the film or paper, but also illustrated the great intensification of negatives obtainable by this method.]

If the intensifying or toning is unsatisfactory, treatment with an alkaline developer will restore the silver image, and the process can be repeated from the beginning

The ferricyanide and uranium solutions can be used more than once, but the ferricyanide solution must be kept in the dark as much as possible. It is, of course, desirable to use ferricyanide as pure as possible, but an additional advantage of the method of successive treatments is that if the negative or print is well washed between bleaching and treatment with the uranium solution, a small quantity of ferrocyanide in the ferricyanide does no harm, whereas in the mixed solution method it would increase the general staining.

It should be observed that the composition of the final image is not the same in the two methods of working. Namias pointed out (*loc. cit.*) that when the silver image is treated with the mixed solution of potassium ferricyanide and uranium nitrate, the final image consists of uranium ferrocyanide mixed with silver ferrocyanide, and with more or less unaltered silver if the action has not been prolonged. On the other hand, when successive treatment with ferricyanide and uranium chloride separately (or nitrate mixed with sodium chloride) is adopted the final image consists of uranium ferrocyanide mixed with silver chloride. Namias recommended the removal of the silver salt as conducive to the permanence of the image, and suggested for this purpose the use of a 10 per cent. fixing bath containing as much boric acid as it will dissolve. L. Lemaire (*Phot. Corr.*, 1905) had previously suggested the removal of silver ferrocyanide (when the mixed solution has been used) by immersing the plate in dilute nitric acid.

It may be added that when the mixed solution method is used, the substitution of uranium acetate for the nitrate does not affect the composition of the resulting image, but if uranium chloride is used, some silver chloride will be formed in the same way as when the potassium ferricyanide and uranium chloride are applied separately.

When uranium bromide (or uranium nitrate and potassium bromide) is used after bleaching with ferricyanide, the resulting image consists of uranium ferrocyanide and silver bromide.

The silver salts can be removed by treatment with a 10 per cent. fixing bath to which some sodium sulphite and potassium metabisulphite have been added, but the image before fixing must be considerably stronger than the final image is desired to be.

Prussian Blue Toning.

The method of separate solutions can be adopted for toning prints or lantern slides to a blue colour, and the same freedom from general stain is thus ensured. The print or slide is bleached in the ferricyanide solution, well washed and immersed in a solution of ferric chloride (iron perchloride) containing 2 to 5 parts in 100 until the colour change is complete. The first washings should be done with water slightly acidified with acetic or oxalic acid. The blue image is a mixturo of ferric ferrocyanide with silver chloride.

Ferrocyanide Toning Without Using Ferricyanide.

It is not really necessary to use ferricyanide at all if advantage is taken of the fact that silver chloride is converted into silver ferrocyanide by treatment with potassium ferrocyanide. Three processes are involved, it is true, instead of two, but the expensive and somewhat unstable ferricyanide becomes unnecessary.

The silver image, negative or positive, is first changed into silver chloride by treatment with any bleaching solution which will convert it into silver chloride alone, unmixed with any other compound. Nothing is simpler or quicker than a *dilute* solution of potassium permanganate containing some hydrochloric acid. When bleaching is complete the permanganate is washed away, and any brown stain is removed by immersing in a dilute solution of potassium metabisulphite or a dilute solution of sodium sulphite acidified with sulphuric acid. The plate or print is then well washed and placed for not less than five minutes in a solution of potassium ferrocyanide, 5 in 100. After again washing, the bleached image is ready to be treated with uranium bromide (as above) for red-brown tones, or with ferric chloride for blue tones, the composition of the final images being the same as when ferricyanide is used in the first stage.

C. H. BOTHAMLEY.

THE PROFESSIONAL PHOTOGRAPHIC ASSOCIATION

ANNUAL GENERAL MEETING.

THE annual general meeting of the Association was held on Friday, March 8, 1918, the President, Mr. George Hana in the chair.

The minutes of the last annual general meeting having been read and confirmed, the annual report of the Council (the text of which appeared in "B.J." of March 1) was taken as read.

The adoption of the report was moved by Mr. R. W. Robinson, and, in seconding it, Mr. A. Barratt asked what had been the result of the campaign against the "Evening News" enlargement. The original that had been sent to the "Evening News" was thereupon exhibited, together with the enlargement.

The President thought the method of business adopted dragged professional photography to a low level.

In reply to inquiries about the National Portrait Gallery scheme, the Hon. Secretary read a letter from the Secretary of the Royal Photographic Society intimating that a letter had been received from Mr. Jas. D. Milner, Director of the National Portrait Gallery, which the Council of the N.P.S. did not regard as satisfactory. The Hon. Secretary also stated that the matter had been brought before the House of Commons on the previous evening, in the form of a question (reported, with its answer, in the "B.J.," March 15, p. 130).

Mr. Barratt said he approved of what had been done, but thought the result was not at all satisfactory. He was glad to state that the action of the P.P.A. in connection with the taking of photographs of public events and selling the results to the Press by the Royal Flying Corps was entirely satisfactory. The police and other authorities had had instructions not to interfere with the operations of Press photographers, and the supplying of photographs to the Press by the Royal Flying Corps has been put a stop to. He said a new combination had come into existence among a number of Press photographers who had obtained a monopoly of the official photographs issued by the War Office. He would send particulars for publication in the "Circular."

Mr. Barratt further asked whether the Government had consulted the Council before passing the Registration of Business Names Act. He was informed that the Council had not been consulted.

A member asked whether communications made to members through the P.P.A. "Circular" were of the nature of confidential communications. The reply was that owing to the large number of members, which was constantly increasing, and to the interesting nature of much of the information given in the "Circular," its contents were bound to be more or less communicated to others than members. A member hoped that the Council would continue to protest against the action of the National Portrait Gallery, and would treat the matter as one of breach of privilege.

Mr. Lang Sime then detailed the present position of the scheme which he had outlined in the "Circular" for reinstating the owners of one-man businesses who had had to close down on account of military service. He had ascertained through the public Press that it had been proposed to form an organisation, to be known as the "Business Men's Association," the object being to do for traders throughout the whole country what he, Mr. Sims, had proposed to do for photographers. He had attended a meeting of that Association, and had been nominated a member of the Committee as representing the P.P.A. There being many associations attached to individual trades the idea was to amalgamate these. As soon as this could be effected, it was intended to hold a conference at the House of Commons, at which the Government would be represented. The Government would be asked to find £5,000,000 for the purposes of the Association. Whenever possible, the relief would be given in the form of a loan.

An inquiry having been made as to the terms of the order recently made dealing with the prohibition of photography and the possession of photographic apparatus within certain areas, the Hon. Secretary quoted the terms of the order. He read the order to apply to places outside the London area, but paragraphs had appeared in various papers stating that the order referred to places within the London area.

Some discussion took place on the permits necessary to be obtained before photographing, from which it appeared that there was no uniformity in the requirements of the various competent military authorities.

The President-elect (Mr. H. A. Llewellyn Chapman) said that in Swansea it was necessary to have three permits signed by separate competent authorities, naval, military, and civil. He urged members to act with great circumspection, and not to attempt photography without having provided themselves with the necessary authority.

The report was then adopted.

The Hon. Treasurer said that the statement of accounts of the Association for the past year, which had been published with the notice convening the meeting, needed little comment from him. It would be noticed that the number of subscriptions collected was 883, being the largest number that had ever been collected in one year. It should not, however, be taken that this number represented the total membership of the Association. Nearly 300 members had joined the Colours, and their subscriptions were in suspense. The amount expended on the "Circular" had increased, and owing to the appreciation of the members it would probably continue to increase. A further £100 had been invested in War Loan. The Hon. Treasurer's statement was then accepted.

The President then announced that the choice of the members as their President for the ensuing year had fallen upon their member for Swansea, Mr. H. A. Llewellyn Chapman. He felt sure that the heartiest welcome would be accorded him, not only for his own sake, but for the fact that he was the son of their old friend and colleague and former President, Mr. Henry Alfred Chapman. Speaking for himself, he felt that any photographer should be proud to hold the office of President of the Association, now in its eighteenth year, and he looked back upon his term of office with pride and pleasure, and trusted that Mr. Chapman would have an equally pleasant experience.

Mr. H. A. Llewellyn Chapman was then inducted into the Chair and invested with the Badge of Office.

The new President then asked the Hon. Secretary to read the names of those members nominated for the Council. The list having been read, he declared the following to constitute the Council for the ensuing year:—

Members of Council:

London.
Basil, A. B.
Chase, Gordon
Corbett, Alexander.
Dickinson, C. F.
Ellis, Alfred
Fry, S. Herbert
Gray, W. E., F.R.P.S.
Haines, Reginald
Sims, Lang
Speaight, Richard N.
St. George, H. A.
Wakefield, F. G.

Country.
Adams, Marcus (Reading)
Beaufort, J. W. (Birmingham).
Brown, Frank (Leicester).
Chaplin, W. B. (Windsor).
Chidley, T. (Chester).
Cooper, Montague (Taunton).
Illingworth, W. (Northampton).
Lankester, P. (Tunbridge Wells)
Reveley, Tom (Wantage).
Spink, H. C. (Brighton).
Turner, T. C. (Hull).
Watson, A. Swan (Edinburgh).

The President then said: "Gentlemen,—I thank you for having conferred upon me an honour that has made this the proudest moment of my life. I am conscious that it is beyond anything that I deserve, and I am glad to recognise that it is at least partly due to the esteem and respect in which you hold the memory of my late father, who took so much interest in this Association, and for so many years took part in the administering of its affairs. It would have been a proud moment for him to see me in my present position, and I feel sure that if I base my actions on the same policy, both with regard to the Association and to the profession generally, that he carried out through a long career, I may be able to earn the right to think, at the end of my term of office, that I have justified your choice of myself as your chief officer.

"Mr. Hana made a point of the necessity of continuously increasing the membership and of the wisdom of keeping this necessity constantly before us. There can be no possible doubt I shall spare no personal effort to bring the aims and claims of the Association to the notice of those members of the profession who remain outside our ranks, accepting the benefits secured for the profession generally without contribution to the expenses or strengthening the Association by their support. At no period has the existence of the Association been a matter of so much importance as during the troublous times we are now experiencing, when, owing to the general dislocation of trade and the restrictions and legislative interference with our liberty of action, it is impossible to carry on business on the old simple lines. Materials are constantly advancing in price, and, what is perhaps more difficult to deal with, there is a shortage of supplies. Labour troubles affect us all, and there is no immediate prospect of a return to the normal times. It is not impossible that we may have to face further hardship and difficulties, but it behoves us to keep up the fight against circumstances, remembering that although each photographer's main interest must naturally be in his business as a business, we are collectively carrying out work of national importance in securing records of the lineaments of those who are giving their lives in the service of their country. I feel sure I may rely upon the officers and council giving the same support and assistance that they have accorded my predecessor in office, and with that assistance trust that in a year's time when I relinquish my office it will be with the consciousness of a year's effective work."

Messrs. A. Barratt and H. J. Rigden were appointed auditors.

The following resolution was proposed by Mr. A. Barratt, seconded by Mr. Lang Sims, and carried:—"That the Council be requested to consider the practicability of training and employing disabled soldiers and sailors as photograhic workers, and make a report."

The proceedings terminated by passing votes of thanks to the retiring President and the Hon. Treasurer and Hon. Secretary.

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PREPAID LINE ADVERTISEMENTS.—Our publishers find it necessary, in consequence of depleted staff, to require full prepayment of line advertisements before insertion. Senders of advertisements will find on page 133 of the present issue a plain statement of the tariff of charges for advertisements of this kind, from the details of which they need have no difficulty in correctly remitting the sums required for the insertion of their announcements.

X-RAY MOTION PICTURES.

THE first example of this latest achievement in the cinematograph world has reached the Trans-Atlantic Film Company, of Universal House, Oxford Street, W. It is due partly to the support accorded to Dr. E. L. Crusins, of the New York X-Ray Laboratories, by the Universal Film Company of New York, whose productions the Trans-Atlantic handle in this country. Dr. Crusins has been experimenting for almost a year in perfecting his system and the necessary apparatus. The film that has reached this country illustrates the movements of the knee, ankle, and elbow, and Dr. Crusins states that not only the bones, but the movement of the muscles, is clearly shown. I have myself seen the little 300 feet film, and can assure readers of the "B.J." that not only is the photography excellent, but the usefulness of the new achievement is most fully demonstrated.

Speaking personally and from the standpoint equally of the cinematograph and scientific photography, the new pictures will interest cinema patrons for a time, as the effect of motion upon the always uncanny X-ray photograph is positively startling in its effect on the screen, especially when enlarged several diameters. But there can be no question as to the permanent character of its utility in medical science, and, indeed, at present it is even difficult to foresee the whole gamut of possibilities.

The firm are waiting for further examples before deciding definitely as to their procedure and dates in the matter of releasing the films for public exhibition, which is distinctly a wise precaution, the more so, that examples suitable for dental surgery are on the way. But as these films will be issued on what is known as the open market system, they will very shortly be on view at all cinemas. I can promise photographers of all classes an intensely interesting turn at their local "pictures."

WALTER DE WELFORD.

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PHOTOGRAPHIC INDUSTRY OF GREAT BRITAIN.

THE present short article is specially written to direct the attention of buyers of photographic goods in non-enemy countries throughout the world to a most valuable book which has just been published by the British Photographic Manufacturers' Association in the interests of the whole photographic trade in the United Kingdom. It can be readily understood that buyers and importers of dry-plates, printing papers, mounts, chemicals, and photographic apparatus in the way of cameras, lenses, etc., who previous to the war were able to draw upon many European countries for their supplies, have come to learn more of the resources of Great Britain in this branch of industry, and will be glad to be particularly and fully informed of the goods which individual firms in this country are able to supply. The handsome book now issued by the British Photographic Manufacturers fulfils this want in the most complete and comprehensive fashion. It contains a full list of the firms incorporated in the Association (which, it may be said, includes within its membership almost every firm of standing in the trade), and by means of a series of indexes shows the particular firms producing the various staple articles of trade. These latter particulars are arranged in four alphabetical indexes, drawn up in English, French, Spanish, and Russian, and are accompanied by reproductions of the firms' trade-marks and by a register of trade-names, a glance at which allows of the actual source of manufacture of articles passing by any trade name in common use at the present time being quickly identified.

In addition, a considerable part of the volume is devoted to the commercial announcements of individual firms, many of whom have taken the opportunity of addressing themselves to the readers in the French, Spanish, and Russian languages. In doing so they have dealt with their manufactures in the way of exact specification of the qualities and features of their goods, such as is not invariably adopted in commercial announcements. For this reason the section of the volume occupied by these pages will be found of more than ordinary interest to the overseas buyer or importer anxious to be as completely informed as he can of the goods to be obtained in Great Britain. A further prominent feature of the book is a contribution reviewing the stages of photographic invention which have led to the establishment of the photographic industry in Great Britain. The bare recital of these inventions and discoveries during the past century shows that the very great majority of them came from British experimenters, and that the long and firm establishment of the photographic industry in Great Britain is no more than a natural result of the work of the British scientific men of the past, whose results were freely communicated to the world. In this connection it is only necessary to instance a few familiar examples to show the importance of the British pioneer labours in the development of photography. Hypo for fixing, the wet collodion process, gelatine dry plates, carbon and platinum printing, collodio-chloride, bromide, and gelatino-chloride papers were all British inventions, as were also the pyro-ammonia developer, the use of sulphite in developers, the daylight loading of flexible sensitive material, and even the hand-camera itself. With such a past it is little wonder that the photographic industry of Great Britain should have achieved a success which, as regards certain branches of it, has always been unapproached by that of other nations.

In making the above comments on this piece of literature, we should add that copies of the volume have been circulated among important traders in India, the Overseas Dominions of Great Britain, and in many foreign countries. Any important firm which may not have received a copy can be supplied with one on application to the British Photographic Manufacturers' Association, Sicilian House, Southampton Row, London, W.C.

WOMEN'S OPPORTUNITIES AND THE PHOTOGRAPHIC BUSINESS.

[The following notes which we reprint from a recent issue of our Philadelphian contemporary "Camera Craft" naturally reflect American opinion. But inasmuch as it is customary to regard the American photographer as possessed of more than the average measure of initiative in matters of business, it may be of interest to find space for the views which are now being taken in America of the opportunities offered to women in various branches of the photographic portrait business. A distinctive note of some of the opinions, and one altogether characteristic of Americans, is that occupation of one kind in a business may frequently lead to that of another in an altogether different and often more congenial direction.—Eds., "B.J."]

"What I can't understand," said a noted photographer recently, "is why with all this talk of the new professions for women opened up by the war, there is no mention made of photography. It is the most difficult thing in the world to get the right sort of a studio assistant. She must have a certain amount of business efficiency, but she must also possess tact, charm, and subtlety. This is especially important just now when photographs have assumed so vital an importance in the eyes of the feminine sex. Sons going away to war, husbands going away to war, brothers and sweethearts, all must leave behind pictures in mufti and uniforms to give their comfort to those who must stay at home. Also there must be photographs and tinted miniatures for the soldiers to take with them, and all of these things must be arranged with sympathy and understanding. It takes a woman to do that, and I know of more than one prominent photographer who is hard put to it to find the right sort of an assistant."

Such an assertion coming from such a source should offer a hint as good as the proverbial kick to the girl who is looking for a chance to earn her living.

In the first place, it offers three big advantages. Easy hours, pleasant surroundings, and a chance to advance without expensive training. In the second place, it is work which the girl who shrinks from taking a place in a busy office would be less hesitating to accepting, and thirdly, there are a half dozen different fields of work which branch out from such a start.

Such, at any rate, is the belief of three different women who began as studio helpers and who now have big interests of their own. One is head of a studio that makes a specialty of bridal pictures; one is head of a concern that does retouching and enlarging and artistic framing of amateur pictures, and the third is travelling representative of a big photographic supply company.

All three began without experience other than a knowledge of business and typewriting, and one of them even lacked the business course, trusting to her common sense to carry on a well started routine of business.

"Photography," says one of them, "is no longer essentially a masculine business, any more than anything else, but even when men take the photographs themselves they cannot do without woman's help. Nine persons out of ten coming in to have their pictures taken have no idea of what size they want, what finish or even what price they can afford, and all these things must be tactfully ascertained or suggested by the girl who receives them, and who must make them feel that the photographer asks nothing except to please them.

"There must be diplomacy exercised with regard to proofs and the time when photographs will be delivered, while a record, mental as well as typed, must be kept in each instance, that there may be no confusion in the future. Occasionally when pictures are taken at the house the studio assistant pays a call beforehand to arrange for the sitting, and here, too, her tact and her good breeding must be more to the fore than business efficiency, though the latter must be there.

"Of course, as she goes on, a girl is bound to absorb a considerable amount of knowledge of the business she is in, and frequently a girl becomes a skilful retoucher, or perhaps, if she has artistic tendencies, can study to do the delicate colour work, which is now so popular, while she has always before her the probability of having a studio of her own some day.

"This, you know, is an age of specialists, and people are beginning to pick photographers for their skill in some line. Here for children, there for young girls; another place for men, and so on, for the art of the photographer is as definite as the touch of the artist who works in paint."

Another successful woman photographer, who began as an assistant at the studio, says that her first step from the studio of receiving customers, etc., was to solicit orders for photographs on commission.

"I made arrangements," she says, "to sell photographs to the more expensive of the magazines carrying photographs of fashionable women, their homes and their activities, and then I took a social register and began to go right through it, seeking pictures. Of course, I got many refusals, but I also got many photographs, which I sold; and where photographs were not to be had I was usually able to persuade the women to pose for a photographer, from whom I received a commission, so that my work was doubly paid.

"I kept this up for some time, but I liked getting of orders for bridal pictures so much better than the other lines that I began to specialize on that, and finally opened a studio with an expert camera woman, just for that sort of work, and we have succeeded far beyond our expectations.

"So far as getting a position is concerned, I think the easiest way was the fashion in which I got mine. I went to the artist who had done a number of pictures of me in more prosperous days, and asked him if he thought I could get work as a model for photographic work. He thought it possible, but said I would probably like better the position of a sort of hostess-in-chief for a photographer. We talked it over, and he gave me letters to three fellow workers, with one of whom I secured a position."

For those girls who have no friends among photographers the simplest way would be to take the list from the telephone book and pay a personal call upon each. The more expensive and fashionable studios offer the greater possibilities, and a call will give the photographer a far better estimate of your suitability than any number of letters. If they have no vacancies, it would be well to write them a letter after you go home asking them to put it on file and consider it an application for work if they need you.

Trim clothes, a good appearance, a ready smile, and a determination to throw yourself whole-heartedly into the work of meeting customers is your best stock-in-trade; and beyond that you must be able to handle and make out bills, to keep books, answer letters, tend to telephone messages, and keep a card index of names, addresses, and the number of pictures ordered.

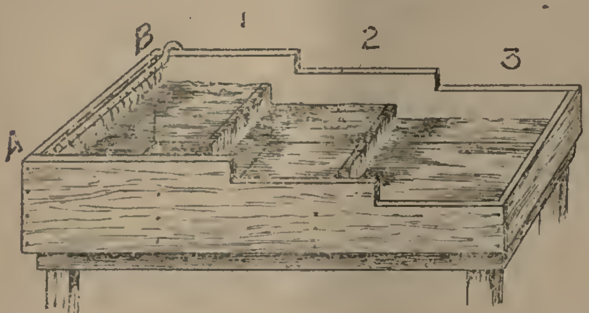
In between times it is well to study the studio, the appurtenances and the way the work is done, for the knowledge gained will be of tremendous service. You will be called upon to settle moot problems of what type of dress photographs best; you must be ready to take an earnest interest in the question of a hat or no hat—and you must be able to speak and give intelligent advice.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

A Three-Part Washer.

Some little while ago, in a number of the "Photo-Miniature" devoted to specialised commercial methods (or printing, developing, etc., in quantity), an illustration was given of a tank for fixing or washing, consisting of three separate divisions, through each of which, separately, a stream of water could be passed. The object of the triple construction was evidently the saving of materials and workmanship in construction, and on that account is to be commended. On the other hand, a very little revision of the pattern of the tank yields an appliance which does its work equally satisfactorily, is more economical of water, and at the same time of itself systematizes the washing of prints and renders that operation more efficient. We have taken the liberty of re-sketching the tank, and from our drawing, which, it should be said, is diagramatic, it will be seen that the three tanks are made upon a cascade pattern, the water entering from a perforated pipe, A B, passing from tank 1 to tank 2, and thence into tank 3, from which it passes off by an overflow pipe not shown. The divisions between the three tanks are so made (as regards level) that each constitutes a weir, the water flowing successively from the higher to the lower level. In practice this tank is used by placing the batch of prints which are to be washed in No. 3. Here they are turned over by hand in the usual way. As soon as a fresh lot is ready for washing, those already in No. 3 are transferred to No. 2 and the new batch placed in No. 3. Again, when a further batch is to be treated, those in Nos. 2 and 3 are moved up into Nos. 1 and 2 respectively, the prints fresh from the fixer being placed in No. 3. It will be seen that by working upon this system the freshest water encounters prints which have already been more or less washed. This is as it should be, and is, of course, the principle upon which all washing by hand is or should be done, whatever may be the dishes or tanks employed for it. The virtue of the triple tank with the flow of water from an upper to a lower level is that once an assistant has been made to understand that prints are gradually worked up batch by batch from the lower to the top tank, the washing then necessarily is done in the best manner. It should be explained that a tank of this kind is not intended to work by itself. Perhaps our artist's representation of the water entering in jets and passing from one tank to another may mislead on this point. Therefore it must be emphasised that prints, whether in tank No. 1, 2, or 3, are kept constantly on the move by hand as long as they are in the water. The pipe, A B, with its row of jets and the two weirs over which the water passes, are simply conveniences for saving the emptying and refilling of separate dishes.



Renovating Camera Bellows.

When the bellows of a field, or studio, camera become soft and generally out of shape after a long term of use, the operator naturally wishes for some means of stiffening them. I recently made an excellent renovation on an old instrument that I sometimes use by giving the bellows a coat of ordinary commercial Brunswick black. The best way to do this is to rack the camera out to its fullest extent, and if thought necessary, an examination may be given in the dark-room with the aid of a pocket flash-lamp switched on inside the bellows, so that any pin-holes or transparency due to wear may be traced, and repaired by sticking an odd piece of thin leather, cloth, or even black paper, over the part on the inside of the bellows. The Brunswick black may then be applied in the ordinary way, with a small, stiff brush, care being taken that it is well rubbed into the creases and folds, as if this is not done the best results cannot be expected. If the bellows are very soft and inclined to "sag," or fall out of shape generally, I should recommend that a coat of black be given inside as well, as this adds materially towards stiffening, but in this case a couple of coats of the ordinary dead black varnish will be needed in order to prevent internal reflection. After the black application is thoroughly dry and hard, the camera should not be racked in until the Brunswick black is quite hard, as the bellows may be inclined to stick. This only takes a day or so if the instrument is put in a warm place. Camera bellows are nearly always neglected until they begin to show signs of wear, but if of leather they will well repay a periodical application of a good brown boot cream, or polish, such as "Wren's," rubbed well in with a fragment of rag. When the polish has been on a few moments it will be easy to get a good gloss with a soft cloth or small brush, which will be found to improve the appearance of the instrument, and the cream will also supply the nourishment that the leather needs in order to prevent it from becoming too hard, dry, and out of condition. For this, brown polish is superior to black, as it is cleaner in use, will not rub off, and has the same effect. If the colour of the leather has become rubbed a good plan is to give it a coat of common black ink and allow this to dry before polishing. New leather bellows are at any time an expensive item, and in view of recent restrictions it is likely that even if obtainable they will be considerably higher in price.—Expert.

FORTHCOMING EXHIBITIONS.

April 18 to May.—Hampshire House, Hammersmith, Photographic Society. Entries close March 19. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12

Commercial & Legal Intelligence.

Eastman Kodak Co.—The directors have declared an extra dividend of 7½ per cent., payable on June 1, to stockholders of records at the close of business on April 30. The usual quarterly dividends of 1½ per cent. upon the outstanding Preferred stock, and of 2½ per cent. upon the outstanding Common stock, will be paid on July 1 to stockholders of record at the close of business on May 31.

Season Ticket Photographs.—It is stated (according to the "Times") that there is no immediate intention of requiring a photograph to be attached to season tickets, and that it is not likely that this condition will apply to the London Underground Railways.

Prepaid Line Advertisements.—Our publishers will be glad if senders of prepaid line advertisements will in future take particular care that they *are* prepaid, otherwise there will be delay in their insertion. On page 133 of the present issue we print a series of notes which advertisers of situations vacant, etc., are asked to read carefully. From them and from the letterpress accompanying them they will see that a great deal of unnecessary labour is thrown upon our depleted publishing staff by omissions to observe the existing tariff of charges for advertisements of this kind.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, February 18 to March 9:—

Colour Photography.—No. 3,115. Films, screens, or plates for natural colour photography. J. Camiller and J. C. Lyell.

Cinematography.—No. 3,116. Films or screens for cinematography. J. Camiller and J. C. Lyell.

Cinematography.—No. 2,988. Cinematographic apparatus. D. S. B. Shannon.

Cinematography.—No. 3,491. Cinematograph films. R. W. Bateman.

Colour Photography.—No. 3,275. Method of producing permanent natural-colour effects by the action of light. H. Soar.

Cameras.—No. 2,946. Cameras. H. J. Craymer.

Dark Slides.—No. 3,230. Dark slides, plate-holders, and magazines for photographic cameras. R. Edwards, G. A. Pickard, and Thornton Pickard Manufacturing Co.

Colour Photography.—Nos. 2,910 and 2,911. Colour photographic image and method of producing the same, and process of colour photography. Hess Ives Corporation.

Trade Names and Marks.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register.—

Metzol.—No. 377,442. Photographic paper. Metzo, Ltd., Scots Bridge Mill, Rickmansworth, Hertfordshire; manufacturers of and dealers in photographic paper and chemicals.

Metzo, Limited (Swastika design).—No. 378,143. Chemical substances used in photography. Metzo, Ltd., Scots Bridge Mill, Rickmansworth, Hertfordshire; manufacturers of and dealers in photographic paper and chemicals.

J V.—No. 378,170. Photographs and reproductions from photographs. Valentine and Sons, Ltd., 19, Ivy Lane, London, E.C., fine art printers and publishers.

Photone.—No. 375,170. Pictures, portraits, post and other similar cards, photographs, and other art publications. Thomas Hibbard Mason, trading as A. Mason and Co., 205-207, St. James Road, Croydon, Surrey, wholesale and export artistic stationer, art printer, and publisher.

Hydrosin.—No. 380,786. Photographic developers (chemical). White Band Manufacturing Company, Ltd., 121, Selsdon Road, South Croydon, Surrey; manufacturing chemists.

TRADE MARKS REMOVED FROM REGISTER.

In the official language of the "Trade Marks Journal" the following trade marks have been "removed from the register through non-payment of renewal fees." Such non-payment is of course the method adopted by a firm having no further occasion for the use of a mark.

Crysovite.—No. 260,012. Société Anonyme des Plaques et Papiers Photographiques A. Lumière et ses fils. Registered in Class 1 in 1904.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, March 25.

Bradford Photographic Society. Annual Meeting.

Tuesday, March 26.

Birmingham Photographic Society. "Normandy Notes." A. E. Guy Pritchard.
Sheffield Photographic Society. "A North Yorkshire Coast Resort." H. C. Hemingway.
Hackney Photographic Society. "On Wold and Down." J. Grice.
Manchester Amateur Photographic Society. "Cumberland. Its Lakes, Its Fells, and Its People." J. Hayward.

Wednesday, March 27.

Croydon Camera Club. "Palladiotype." W. H. Smith.
Bristol Photographic Club. "Gloucestershire and its Associations; Pictorial, Archæological, Historical, &c." W. F. Kuner.
Ilford Photographic Society. "Round About Borrowdale." W. Rawlings.

Thursday, March 28.

Stockport Photographic Society. Lancashire and Cheshire Union Folio.
Sunderland Photographic Association. Members' Annual Exhibition.
Liverpool Amateur Photographic Association. "River Scenery of South-East Ireland." P. O'Mahony.
Hammersmith (Hampshire House) Photographic Society. "Florence and the Cities of the Etruscan League." W. Sanderson.
Morley and District Photographic Society. Snow Picture Competition.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, March 19. Mr. J. C. Warburg in the chair.

Mr. N. E. Luboshez delivered an informal talk on the practical work of developing negatives, detailing at length the methods which he followed in dealing with different degrees of exposure by variations in the constituents of the developer, and prescribing rules for the guidance of the beginner in judging the treatment required in development in this respct and in relation to the character of the subject. In the course of the discussion he also dealt with the development of X-ray negatives.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held on Friday, March 8, previous to the annual general meeting. Present:—Messrs. A. Ellis, G. Hana, Gordon Chase, R. Haines, A. Corbett, C. F. Dickinson, S. H. Fry, H. A. L. Chapman, A. Mackie, R. N. Speaight, W. E. Gray, Marcus Adams, Frank Brown, F. G. Wakefield, W. Illingworth, and Lang Sims.

A letter was read from the Secretary of the British Photographic Manufacturers' Association, enclosing a letter from the British Moulding Association, asking photographers to adopt a stock size for cabinet and other photographs. The Hon. Secretary stated the nature of his reply.

The second year of publication of the P.P.A. Circular, new series, authorised by the Council, having terminated, the Council authorised publication for another year, at a cost not to exceed £125.

Mr. Lang Sims reported progress of negotiations for a new arrangement for securing similar terms for insurance for members to those formerly granted by the Fine Art and General Insurance Company.

CROYDON CAMERA CLUB.

Mr. Olaf Bloch, F.I.C., lectured on "Some Common Plate Pitfalls, and How to Avoid Them," a title which ill indicated him to be an intrepid explorer of regions traversed only by the few. Not content with the pitfalls experienced by the mundane, he has deliberately gone out to look for further trouble, and a host of rare and horrible catastrophes, with great ingenuity, has been invented or discovered by him to give piquancy to the great adventure. However, it may be refreshing to anticipate possible evils, especially in these days when something is badly needed to distract the mind from that ever present internal buoyancy due to a quasi-vegetarian diet. A popular ex President, of full habit, swears by a bismuth and magnesia compound, and by its aid hopes to escape being taken for an observation balloon on the loose.

But whether the pitfalls were common or not, the lecture can be honestly described as one of great interest, capitally delivered in a popular style. In fact, Mr. Olaf Bloch went down like hot cakes. It covered so much ground that only a few of the many troubles diplomatically alluded to as being due to "variations of routine" can be glanced at. A complex tape-worm effect was found to owe its origin to the sun shining through a pinhole in the camera front. The markings caused by abrasion of the film before and after light action were clearly shown. Undissolved particles of amidol in the developer gave light spots where the particles rested. Reticulation, due to changes of temperature of solutions and somewhat similar markings, caused by not keeping the developer in movement during the early stage of development, were well illustrated. Another slide showed black patches of fog, caused by electricity generated by polishing the glass side of the plate with a silk pocket handkerchief in dry weather, and an example of spurious reversal due to an unsafe dark room illuminant was also interesting. Here the image as it developed protected the emulsion beneath it from light action in ratio to the amount of silver present, the shadows being proportionally more fogged. Identical exposures on a portion of a film dry, and a portion damp, showed the former to have appreciably greater sensitiveness.

Apart from light-action, of the many things which can induce fog, peroxide of hydrogen, the lecturer said, comes easily first, and, being an oxidation product of many substances, fog due to its action is fairly common. Certain woods act powerfully in this way, which can be prevented by painting them with a weak solution of permanganate of potash. Paraffin wax, including waxed paper, is a good protection, and dry plates should always have a waxed-paper wrapping. Shellac and celluloid in amyl acetate are innocuous: powerfully the reverse, linseed and other oils, turpentine and terebene. Of the metals, zinc has the worst reputation, and copper and steel have the best. With metals, a deposit of platinum black, by its catalytic action, will act as a safeguard for centuries, provided it is not "poisoned," for it has been found that some reagents—arsenic, for example—will destroy the catalytic action in a short time.

In the discussion, Mr. F. C. Reynolds paid a high compliment to Mr. Bloch by saying that, speaking as a lanternist, he had never been so ably supported by a lecturer. Mr. J. M. Sellors anathematised the paper slips used in packing to separate the plates. Owing to their action, fog had frequently invaded and laid waste appreciable areas of pictorialism wrested from Nature. He had also found, when developing bromide papers, that the image had a tendency to jump up at the place of first contact with the developer, and other portions never entirely caught up. "How high does it jump?" inquired the "office boy," and immediately subsided under the Sellorian aspect. Mr. E. A. Salt mentioned that years ago he purchased a box of plates which, under normal treatment, gave positives instead of negatives. He also alluded to the amiable discussion in the "B.J." some time since on the "Mackie" line. From observing recent examples in cinematograph films, he had reverted to a previous opinion that the generally accepted explanation in itself was inadequate, and some other factor or factors unknown in all probability existed. The President, Mr. A. F. Catharine, congratulated the lecturer on having discovered ways of spoiling plates never dreamt of by the multitude. In one case, when developing a plate without previously removing the backing, owing to insufficient rocking of the dish, he had secured markings almost identical with those shown to be due to undissolved particles of amidol.

Mr. Olaf Bloch, in reply, said that the paper slips complained of by Mr. Sellors were used as a protective against abrasion markings. Modern slips do not encroach further on the plate than the width of the rebate in the dark slide. As regards Mr. Salt's observations, it was not unknown for batches of plates to give positive instead of negative images, but care, naturally, was taken not to send such out. He quite agreed with the remarks made on the "Mackie" line; further investigations were necessary to account fully for their origin. A most hearty vote of thanks was accorded the lecturer with great acclamation.

News and Notes.

View Postcards.—Mr. A. J. C. Lewis, New Barnet, Herts, sends us a selection of postcards in black and sepia made by him for those issuing their own view postcards. His work from customers' original negatives is certainly exceedingly good. Most of the cards sent to us have the picture printed up to the edge, but cards are, of course, supplied when preferred with a narrow white border. We can speak very highly of the glazing and sepia toning of these postcards, particulars of the prices of which may be obtained on application.

Export of Photographic Plates and Papers from France.—It is notified in the "Annales des Douanes" for March 1 that, by way of exception to the prohibition of the exportation of photographic plates and papers from France, a general licence has been granted for the exportation of the undermentioned goods to all Allied or neutral countries except Switzerland:—Photographic plates, negative, sizes 18 x 24 cm. and below; positive plates of all sizes; radiographic plates of all sizes; plates for colour photography; citrate of silver papers of all sizes; and postcards and cards, of all sizes, sensitised with citrate or bromide of silver.

A Skin Ink in Radiography.—For marking the skin of patients who are examined by means of the fluorescent screen, an ink is recommended by Captain F. S. Finn in the "British Medical Journal" as answering all the requirements of the X-ray operator, and at the same time as being unobjectionable to the patient. The ink consists of:—Pyro, 1 part; methylated spirit, 10 parts; strong liquor of ferric chloride, 2 parts; acetone, 20 parts. The stain made by this ink shows up against iodine, is unaffected by spirit, ether or soap, lasts for five days or more when covered with dressings, and is visible immediately it is made. At the same time it is without any irritating action on inflamed or tender skin.

The Eastman Kodak Company in the War.—We learn that Mr. Frank S. Noble, director and assistant treasurer of the Eastman Kodak Company, has been appointed by the United States Government Director of the Rochester Division of U.S. Munitions Production. To undertake this work, he is temporarily relinquishing his duties in the Eastman Company, and devoting himself to the expedition of war supplies throughout the munition works in his district.

The Rochester works of the Eastman Kodak Company, in addition to being the scene of important munition supplies, is now also a temporary school of photography for the training of a thousand men in this branch of military service. The newest and largest building of the Kodak works—that for baryta-coating, and possessing a floor-space of nine acres—has been allocated in part to the U.S. Signal Corps, under whom the training of men for the photographic service is being carried out with the assistance of some fifty technical instructors drawn from the Eastman Kodak staff. These provisions are temporary only, and have been accepted, on the offer of the Eastman Kodak Company, until a permanent school shall be completed at one of the large flying centres about August next.

British Industries Fair, 1918.—The third British Industries Fair is again limited to only four trades, namely, pottery and glass, fancy goods, toys, and stationery and printing. Exhibitors whose goods are of photographic interest are to be found in this latter section, and notable among them firms undertaking quantity photographic printing. Messrs. Phillip G. Hunt and Co., 332, Balham High Road, S.W.17, show a large variety of the many descriptions of their real photographs produced by automatic machinery. In addition to postcards, matt and glossy, plain and hand-coloured their productions include views of larger size, cigarette pictures as well as photographs for box tops, window cards, calendars and general advertising. A novelty which is shown, is a napkin-ring, in which a photographic subject is introduced. Messrs. Lilywhite, Limited, Halifax, exhibit a similar series of lines, and direct attention also to their engineering and commercial photography, and to original designs in embossed and coloured postcards, many of which bear the words of songs accompanied by photographs in illustration of them. Messrs. E. T. W. Dennis and Sons, Limited, in addition to much letterpress and collotype printing also exhibit specimens of machine photo-printing.

Photographic mounts are represented by three firms. Messrs. Marion and Foulger, Limited, 3, Soho Square, W.1, devote the chief part of their exhibit to the many styles of wood and metal frames, and make comparatively little display of their production of mounts. Messrs. Halsey and Davison, 14, Carlisle Street, W.1, show a very large variety of the many styles of mounts for professional portrait photographs and for technical prints and enlargements. Folder mounts for sketch portraits and the wallet type of mount now so much in favour are among their exhibits. In fact, they lay themselves out to manufacture to a customer's requirements, in making which comment upon them it must be borne in mind that they are manufacturers upon the very large scale, and are unable to accept direct orders, except those for mounts in large quantities. The third exhibitor of mounts is Mr. Argent Archer, 140, Kensington High Street, London, W.8, whose display is of a very special character—that is to say, a series of war memorial mounts, in which a realistic patriotic design (evidently of photograph origin) is provided as the setting for the portrait. The Nelson Monument in Trafalgar Square is requisitioned—and very effectively—in this way, and the design represents a variation from the more embellished descriptions of memorial mount, which doubtless will be appreciated by the more discriminating of a photographer's customers. Another exhibit which should have some interest at the present time is that of the British Drawing Ink and Adhesive Manufacturing Company, 31, Great Ormond Street, London, W.C.1. The company is now making and supplying albumen colours for tinting photographs, postcards, etc., and is also the manufacturer of a pure white gum mountant for photographic prints. While there are many fine exhibits in this and in other sections the above covers practically all those which directly relate to the photographic trade. The great size of the Fair, which this year is housed in large premises of the London Dock, shows the firm hold it has obtained upon the branches of industry with which up to the present it has concerned itself. Our readers abroad should particularly note that it has now become an established [illegible] of the activity of the Department of Overseas Trade, 10, Basinghall Street, London, E.C.2, to which applications should be made for admission to the Fair which, in all probability, will be held about this time next year. Nowhere in the United Kingdom has an overseas buyer the same opportunity of examining goods of so many different manufacturers, the all-British proprietorship of every one of which is the subject of confirmation before admission to the Fair.

Correspondence.

**** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

**** We do not undertake responsibility for the opinions expressed by our correspondents.*

SOFT WATER AND BLISTERS.

To the Editors.

Gentlemen,—That soft water conduces to the formation of blisters on bromide paper is not so well known as it might be. In this town our water comes through peaty soil and is naturally soft. Some years ago cases of lead poisoning occurred, due to the solvent action of this water upon the lead service pipes. Since then the water has been treated in such a way as to prevent any further trouble occurring. The effect of this treatment is to "harden" the water, and lead poisoning and, incidentally, blisters on bromide paper are both things of the past. In the old days we had no end of trouble with blistering, the use of alum and even formaline being of no avail.—Yours faithfully, ALBERT O. FORRESTER.

Pontypridd, March 19, 1918.

HYPO RECOVERY.

To the Editors.

Gentlemen,—In my former letter I endeavoured to give Mr. [illegible] a friendly hint that his conclusions were likely to be vitiated by his use of ammonia, but apparently he does not see the point. If, however, he really gets ammonium thiosulphate in partial replacement of some of the sodium salt, then, as the sodium and ammonium salts have very different rates of fixing, the time of fixation must be affected very materially. From his figures it appears that he must have been using a weak fixing bath, and in that case, as ammonium thiosulphate is far quicker in its action than hypo at low concentrations, his "restored" bath should have been a quicker fixer than the original one. I have dealt with the effects of ammonium compounds and of ammonia before in the "B.J." for March 13, June 5, and June 12, 1914, and hope to have something more to say about these shortly. In precipitation experiments, however, any complications due to ammonia are easily avoided by using sodium sulphide. Whether the complete recovery of the hypo is possible or not is still uncertain. I said that my experiments tended to show that it was not, but the attempt to plot the results shows many anomalies. It is by no means easy to measure the time of fixation, and the methods that served me so well before are not adaptable to these silver solutions. A new system of testing is, therefore, now in hand, and if it proves efficient I trust the point will be settled definitely. It is, of course, of small importance from the practical point of view, but still of considerable theoretical interest as a minor detail of the theory of fixation.—Yours, etc., C. WELBORNE PIPER.

March 15, 1918.

THE COVERING POWER OF A LENS.

To the Editors.

Gentlemen,—Except in a very restrictive sense, I think few will agree with Mr. W. E. Debenham's contention that "a lens covers an area over which it produces a photographic image." If that image away from the axis is so aberrated as to be useless, then an indication of the area illuminated expressed as "covering power" may be positively misleading, though it may represent a "basic fact."

I once purchased a lens of nearly 6 inch focus, listed for a quarter-plate, advertised to cover an angle of about 80° representing a wide angle. Not unnaturally, I anticipated that, well stopped down, it would prove useful as a mid-angle lens on a half-plate. Trial showed it to possess brilliant central definition, but owing to violent marginal aberration it dismally failed on the larger plate, even with a small stop. Here the "basic fact" merely gave an indication of the amount of stray light which might enter the camera, and served no other purpose whatever except to lead one astray.

Although the circle of illumination, *per se*, is of no use to the photographer, yet the circles of *useful* definition with varying stops most obviously are. Standards of definition, whilst desirable, hardly apply, for lens makers afford no information even for the plate an objective is primarily designed to cover, and they are not likely to abandon this attitude. A lens designed to give an aberrated (soft-focus) image is a special case, and must be considered by itself.

So far as my experience goes, with nearly all present-day photographers the term "covering power" has acquired a definite meaning relating to useful definition over a certain area, with a common sense allowance for varying types of lenses, and also variations in their price. This being so, whether the terms applied be correct or not in an academic sense, it is useless to attempt to alter it. Mr. Debenham's version of "covering power" can be expressed without ambiguity as the "maximum circle of illumination." This dispenses with the words "photographic image" incorporated in his definition, the insertion of which appears to be exceedingly unfortunate, unless an unrecognisable marginal blur, which may exist, is to be deemed a photographic image.—Believe me, gentlemen, with great respect, "AN OFFICE-BOY."

RECOVERY OF SILVER FROM SPENT FIXING BATHS.

To the Editors.

Gentlemen,—Your notes on the "Recovery of Silver Residues" in the issue of the 1st instant were very interesting to us, as our friends frequently ask us to instruct them how to treat their spent hypo baths.

We have never had reason to doubt that all the silver may be extracted from waste hypo solutions by means of liver of sulphur, provided that time be allowed for the necessary reactions to take place, and sufficient care given to testing the precipitated liquors. We always advise our friends to add solution of liver compound at the rate of about two ounces of liver compound per gallon of waste liquor, to mix the solutions and allow them to stand a day. After this interval a glassful of the clear top liquor is tested with liver solution, when a brownish precipitate indicates that further liver solution must be added to the bulk, and a fresh test made on the following day. (A white precipitate of sulphur, however, is often observed from the interaction of sulphite and sulphide, and must not be mistaken for silver sulphide.) By this means full time is allowed for the substances to react, and no values are thrown away through lack of testing.

Having five spent fixing solutions from different sources in our laboratories, we ran a series of tests on them with both liver compound and sodium monosulphide, to determine whether any variation from our normal experience might be obtained. The solutions were in three cases plain fixing baths, in two cases acid fixing, and in one case there was considerable contamination with developer; the silver contents ranged from 36 to 216 grains per gallon. We varied the method of carrying out the precipitations, in some cases adding a considerable excess of sulphide at once, in others just enough, and in still others a quantity insufficient to throw out the whole of the silver, so that further addition was necessary on the following day. In every case the whole value was finally precipitated whether the liver compound or sodium monosulphide was used, and in no case did we find that the silver precipitate was re-dissolved if excess sulphide had been used.—Yours faithfully, A. B. SUART.

Johnson and Sons' Smelting Works, Ltd.

London, March 18, 1918.

[We are glad to have the assurance of Messrs. Johnson's, from their wide experience, that liver of sulphur may be depended upon in ordinary circumstances to throw down the silver. Apparently the experience which prompted the notes in our issue of March 1 arose from an exceptional sample of "liver," any ineffective action of which may be usefully supplemented by that of a purer sulphide chemicals.—EDS. "B.J."]

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

E. O.—The prints appear to be on a semi-matt gaslight paper

H. J. W. AND SONS, LTD.—James Hetley and Co., 35, Soho Square, London, W.1, can probably supply a small quantity.

A. B. H.—Certainly, the photograph is copyright, and you must apply for permission, giving full particulars. If only one enlargement is required for private use, it is possible no objection will be made.

E. G. PASCAL.—Under good conditions of storage (a dry, cool place) a year is a very reasonable time. Most usually, tendency to general fog, with band of surface fog round edges of negatives if very stale.

MAX RYCOTT.—You should give your address in sending a letter for publication. If you do so, kindly confirm your reference to the "B.J." of March 3, 1905. We cannot find any letter from you in that issue.

A. F. WADDELL.—1. The best stain is that made for this purpose by the Vanguard Company, Maidenhead. 2. Form for registration (under the Registration of Business Names Act) from any post-office. The fee is 5s.

H. G. B.—As we understand the official announcement, there is no distinction drawn between types of cameras, and we can readily believe that in the official mind a ferrotype camera, taking a 2-in. button picture, would come just in the same class as a 15 by 12 outfit. Your best course would be to address an inquiry to Headquarters, London District, Horse Guards Annexe, 12, Carlton House Terrace, S.W.1.

F. E. WALKER.—The normal formula for the plates mixed with three or four times its bulk of water, and with addition of about ½ grain bromide per oz. of the (weaker) solution, and of soda sulphite, say, 5 grs. per oz., also of the working developer. 2. Try rinsing rackfull of plates under the tap before putting in tank; also removing air bubbles from surface of developer in tank before inserting rack.

H. G. R.—1. There is no objection to fixing prints developed by metol and amidol in the same bath; as a matter of fact, we have fixed prints made by different developers simultaneously. 2. You should varnish or medium uranium intensified prints to protect them from the atmosphere. Try gently rubbing with a little turpentine to remove the tarnish; then varnish. 3. We do not think the price too high for the enlargements if of good quality.

L. S.—The best form of supplementary lens and the best position for it must depend to a large extent on the particular lens to which it is adapted, so it is rather difficult to give any definite advice. We rather doubt if two 50-inch lenses will work any better than one 25 inch. In all probability a simple meniscus fitted over front or back lens will do what you require quite satisfactorily; possibly the back position would be best, as the back lens is of the longer focus.

W. G. G.—The usual method in the trade when using the cheap bromide papers of rather poor quality is to mount on the canvas stretcher with a cheap paste of thick consistency, but we should recommend you to use the better quality photo mountant, such as supplied by Messrs. Johnson, Fallowfield and others. If the enlargements are on paper of good quality, you can mount them very perfectly with a glue mountant used according to the following instructions:—Damp the drawing or print all over, and when quite moist stretch it slightly lengthways and sideways as well, taking care to stretch it equally so that it will be quite flat. Then lay it down on the strainer face up, and turn up the edges for half an inch, or an inch, according to the size of the print, all around. Run an edging of strong hot glue all round the turned-up edges, and then rapidly rub them down on to the strainer. Put the strainer away to dry in a perfectly horizontal position, on no account standing it up on edge. When dry the print will be found to be strained as tight as a drum head, and nothing but excessive damp will ever cause it to buckle. The glue must, of course, set before the paper dries, otherwise the glue joint will separate. It is, therefore, as well slightly to moisten the centre of the print now and then during the first hour or two.

DEVELOPING-FIXING.—Will you please send me a formula for developer, for combined developer, and fixing of ferrotype plate, as used in Telephot button cameras?—W HAYNES.

We have no experience of these formulæ ourselves, but the following was recommended a year or two ago by a practical worker in this line:—

Hydroquinone	300 grs.
Metol	30 grs.
Carbonate of soda	2 ozs.
Sulphite of soda	2 ozs.
Bromide of potassium	40 grs.
Water	20 ozs.

Put the two sodas into a dry bottle, add the hydroquinone, shake well, pour in 1 pint of water, and shake until dissolved. Dissolve the metol in half a cup of warm water, pour it into the bottle, add the bromide and shake well. This developer is now fit for ordinary dry-plate work, and can be used over and over again for plates and papers. For positives direct:—

Hypo	6 ozs.
Ammonia liq. .880	1 oz.

Put the hypo into a dry bottle, pour in the developer, and shake well until dissolved; then add the ammonia. Keep well corked, and the developer will keep good for some years.

The British Journal of Photography.

Net Prepaid Line Advertisements.

Tariff of Charges.

18 words or less	1/-
Extra words. For every three words or less, ...	2d.

(No reduction for a series.)

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

Special Note. Adv'ts. under a Box Number.

For words "Box No." and office address in adv't. add 4d. per insertion.
For forwarding replies ... ... 6d. per insertion for each adv't.
If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts. should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

Cheques and Postal Orders should be crossed "____ & Co." and made payable to HENRY GREENWOOD & CO., LTD.

DEPOSIT SYSTEM.—When selling goods to strangers, or purchasing, all risk is avoided by employing our deposit system. Cost is trifling. The purchase-money must be deposited with the publishers, HENRY GREENWOOD & CO., LTD., 24, Wellington Street, W.C. 2, and all Cheques, Money Orders, &c., made payable to them. Acknowledgment is sent to both parties and deposit is held until receipt of advice that goods have been received and found satisfactory, in which case the amount deposited is forwarded to the seller, less a commission of 2½ per cent. (minimum, one shilling; maximum two shillings and sixpence). If goods are not approved the publishers wait original owner's acknowledgment of their safe return before refunding the deposit. In this case the minimum commission only (one shilling) is deducted. All disputes or questions arising from such causes as damage of goods in transit, &c., must be settled between the contracting parties. The deposit is held by Messrs. Greenwood pending settlement. Messrs. Greenwood do not undertake to express any opinion on the condition or value of goods, nor must the goods be sent to them.

⁂ To prevent delay communications relating to Advertisements and general business affairs should be addressed to the publishers. All advertisements are received subject to their approval or revision, and the right is reserved to refuse any advertisement without giving a reason for so doing. The publishers are not responsible for clerical or printers' errors, but every care is taken to prevent mistakes.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 3021. Vol. LXV. FRIDAY, MARCH 29, 1918. Price Twopence.

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SUMMARY

Senders of small advertisements will find on the opposite column of this page the schedule according to which our publishers reckon the number of words in announcements. Publication of this schedule should remove any difficulty or doubt in prepaying these advertisements correctly. This information is published for the reason that small advertisements cannot in future be inserted unless fully prepaid.

Mr. O. H. Bohe, in an article on portraits of children in the *Photographic Journal of America*, signalises the preliminary making of friends with the sitter as the essential part of the programme in securing pleasing portraits. (P. 151.)

Mr. A. Lockett, in a contributed article, has some timely hints to give on the renovation of studio apparatus and accessories. (P. 148.)

Evidence is conflicting as to the view which the railway companies take regarding the addition of the holder's portrait to a season ticket, but, supposing the idea is taken up, the portraits could be produced very rapidly and economically, and without providing the opportunity for touting by firms of a less reputable order. (P. 146.)

The prominence which the coloured war photographs have attained at the Grafton Galleries should give something of a fillip to coloured enlargements of a quality between the article highly finished in oils and the cheap rubbish which secures its market among the ignorant by canvassing. (P. 146.)

Some of the human factors which lead to wastage of labour in a photographer's establishment are the subject of a contribution to "Assistants' Notes." (P. 152.)

An operator who brought an action in the Bow County Court for the sum of £15 due to him on leaving a situation, obtained judgment for that sum with costs. (P. 155.)

In a leading article we have some notes to make, of interest both to the amateur and commercial photographer, on the causes which militate against a larger proportion of negatives which are "perfect" in the sense of printing equally well in practically every process. (P. 146.)

A four-lens air-space anastigmat is the subject matter of a recent patent specification. (P. 153.)

In the New York *Printers' Ink* a very interesting light upon the policy which has been pursued by the Eastman Kodak Company in [illegible] its goods to the public is shed by an interview with Mr. L. B. Jones, who for some twenty-five years has directed the advertisement activities of the company. (P. 148.)

We regret to announce the death, at the age of thirty-five, of Major C. D. M. Campbell, to whom very largely the efficiency of the military uses of photography in the present war is due. (P. 151.)

One single instance of the immense part which photography has played and continues to play in the war is the making of photographs of the graves of British soldiers in France to the number of 60,000. (P. 146.)

EX-CATHEDRA.

Pricing Small Advertisements. We are glad to have heard from a number of senders of small advertisements that the notes in last week's "B.J." have been welcomed. It is quite natural that advertisers should be as glad to be spared the trouble of remitting a supplementary sum, as our publishers are glad to be spared the trouble of applying for it. As, however, several correspondents point out that the reckoning of the number of words in an advertisement is not all plain sailing, and that it would be a convenience if the precise basis of such reckoning were available to every advertiser, we here print a schedule which, we think, covers all the doubtful kinds of word which arise. To take first words which occur chiefly in addresses. Here the reckoning which our publishers adopt is as follows:—

Initials of names	each initial is one word
E.g., J. T. Smith, three words.	
Nos. in addresses	each number is one word
E.g., 24/25, John St., four words.	
Postal district (and numeral)	one word
E.g., N.W.3, one word.	
Hyphenated words and proper names (towns), &c.	each item is one word
E.g., Second-hand, two words; Ashton-under Lyne, three words; St. Anne's-on Sea, four words.	

But the matter proper of many of these line advertisements presents instances where it is impossible to say that such and such a combination of letters is to be reckoned as one or two words and where, therefore, the only thing to do is to adopt a schedule and adhere uniformly to it. Our publishers have, therefore, drafted a rule for reckoning the number of words in these advertisements, based, quite fairly, on the number of symbols (letters or numerals) occurring in a given expression. Items of money, size, length, time, weight, and the various contractions common in the trade should, therefore, be reckoned as follows:—

Sums of money Sizes of plates, cameras, backgrounds) Apertures of lenses	If only 4 symbols (letters, numerals)...	One word.
Focal lengths of lenses Shutter speeds Weights Times Abbreviations	If longer, but not exceeding 8 symbols	Two words.

According to this rating some things will now be reckoned as one word which were formerly reckoned as two and *vice versâ*. In the aggregate it will make no difference that we can discover in the charges for these small announcements, while it has the advantage of relieving senders of small advertisements from any doubt in ascertaining the sum to be remitted. If we add some examples, drawn from each of the above-mentioned classes, any vestige of uncertainty will, we hope, be removed. These are:—

Money	6s. 9d., £14, £2 8s.	each 1 word	but £12 9s. 6d., £14 19s. 6d.	each 2 words
Sizes	1-pl, 1/2-pl, 6 × 4	each 1 word	but 6½ × 4¾, 12 × 10in., 6ft. × 12ft.	each 2 words
F Nos.	F4·5	1 word		
Focal lengths	6in., 7½in., 10in.	each 1 word	but 14½in.	2 words
Shutter speeds	1/2, 1/5th, 1/8th	each 1 word	but 1/50th, 1-1000th	each 2 words
Weights	14lb, 4½oz	each 1 word	but 100lbs.	2 words
Times	5.30, 6 p.m.	each 1 word	but 9.30 a.m. 7.30 p.m.	each 2 words
Abbreviations	B & W, cab, CDV, o.p., o.w.o., D & E, DD, FP, OA, PC, RR., S.E.R., T.P., V.P., W.A., W.Y.W.	each 1 word	Any abbreviation of more than four symbols, but not more than eight, is reckoned as	2 words

A long story, we are afraid, over a trifling matter of detail, but if it is borne in mind that more than three hundred of these small announcements appear week by week in the "British Journal" it will be seen that in seeking to dispense with correspondence arising from insufficient remittance our publishers are studying the convenience of many individual advertisers no less than that of their own.

* * *

Photography's Great Part. Photography unfortunately has no historian of its own to record the immense services which it has rendered and continues to render in the present war. But every now and then a bare statement is made which gives some hint of the scale of its services. Such a one was the reply to a question last week in the House of Commons when Mr. Macpherson mentioned that photographs of the graves of British soldiers in France had been made to the number of over sixty thousand. A melancholy duty this, but one which has its place among the doings of the camera in the world war. There is more satisfaction in contemplating the positive and tremendous benefits which photography has conferred in the way of saving the lives of our soldiers. Not until the war is ended, and probably not then, shall we be enabled adequately to realise the herculean tasks which have been accomplished by means of the photographic plate as the auxiliary of aerial observation of the enemy's plans and, with the X-ray tube, as a help of the first importance to the surgeon.

* * *

Portraits for Tickets. We note a suggestion made at a meeting of one of our great railway companies that season tickets should have a portrait of the holder. The idea is not a new one, but it has never been put into practice on a large scale. If it is adopted we trust that it will not be made the pretext for reviving the pernicious practice of offering free sittings in the hope that orders for other portraits may be secured. One thing is certain, that there must be a standard size and position of the head, and another is that there must be no retouching. We believe it is the custom for the workers in some munition factories to be photographed in uniform style for the purpose of identification, and in such cases the work is done at the factory by a photographer who attends periodically. Possibly something of the same sort might be done at the great railway stations It would not be difficult to fit up a half-watt lamp in a small office, and, working at a fixed distance, to make the exposures upon a continuous film. The ordinary inch-wide unperforated cinematograph film could be used so as to give a picture 1⅜ in. by 1 in. and it would, of course, be necessary to secure a registered number corresponding with that upon the ticket upon each negative. Some of our professional friends may think that this suggestion is bad for business but we would point out that it would prevent their regular patrons from being tempted away from them by specious offers from less scrupulous firms. From the point of view of the public and the railway companies, the plan has many advantages, as there would be a great saving of time and trouble to all concerned.

* * *

Photographs in Colour. The Exhibition of War Pictures at the Grafton Galleries has probably done more to increase the popular appreciation of photography than any previous show of photographs has done since the invention of the art. Of late years especially such exhibitions have been rather sombre affairs, excellent in pictorial quality, but making no direct appeal to the taste of the general public. As to the artistic value of the war pictures we express no opinion, our object just now being to point out the excellent opening the show should make for the sale of large bromide pictures judiciously tinted. After the war there will be many men anxious to preserve the recollection of some place or incident associated with their military experiences, and the photographer who can supply their requirements at a reasonable price should find it a remunerative line. There has been nothing obtainable between a highly finished enlargement costing many pounds for, say, a 30 by 24 size, and the cheap smudges now on view in most working-class neighbourhoods. Apart from this, there should be a good demand for such enlargements for business purposes. When people again travel for pleasure we hope to see some of these colossal pictures advertising the charms of our coast resorts at the railway termini showing the holiday-makers *en masse* enjoying themselves at Brighton, Blackpool, or Bournemouth, while smaller single studies could fill less important positions.

GOOD AND BAD NEGATIVES.

In our issue of March 8 a contributor, "Thermit," commented very forcibly on the advantages of good negatives, making a strong point of the economy in printing that the provision of really good negatives causes. He defined a perfect negative as the "kind of negative that can be found among the old boxes of almost any first or middle-class firm," and this reference to "old boxes" is a useful reminder that the indifferent negative, which requires special printing paper and various time-wasting printing dodges, is, more or less, a modern introduction. It would be quite wrong to assume that good negatives are no longer produced, for many firms to-day turn out just as fine negatives as their cleverest predecessors, but, still, we fear it could be quite truthfully said that the majority of modern negatives are extremely indifferent productions. Any trade printer will, we believe, confirm this, while the introduction of different printing papers, many of a type that in the old days was not needed at all, is a fairly practical proof.

It is somewhat difficult to define precisely what constitutes a perfect negative. As "Thermit" points out, there are negatives that will print well on almost any printing medium, but it is not easy to point out exactly why they do so. It is, however, quite easy to define one leading characteristic of the average bad negative, and that is fog, and to some extent we can trace out the reasons why fog, nowadays, is more prevalent than it used to be. One of these reasons is doubtless the change in developers, modern developers being more prone to give fog than the old ones. Another is the increase in the speed of plates, and fast plates with fog-giving developers can produce wonderful results.

It is, perhaps, not realised, generally, that the fastest plates of twenty-five or thirty years ago, had a speed no greater than that of a quite medium plate of to-day. It is very difficult to produce a really fast plate that will not fog somewhat readily, and this is usually sufficiently well realised to cause people to use slow or medium speed plates when they want specially clean negatives, but these plates do not differ very greatly from the extra rapid plates on which such good negatives were made years ago. In addition to this, we now use much more rapid lenses, and while in old days we had to rely on $f/8$ lenses and plates of medium speed, we can now use $f/4.5$ lenses on plates that are twice or three times as fast. Also, we use wider angle lenses, which throw a lot of reflected light over the plate, and developers of a soft working type that produce fog somewhat readily.

Some time ago we had a problem put to us by a disappointed amateur, who, with a nice little ten guinea first-class camera found he could not produce a decent negative. The question he put was this: "How is it that Miss So and So, with a second-hand old-fashioned hand-camera, that she has only had about six months, and that cost only about thirty shillings when new, turns out a perfect printing negative every time while I don't get one to a box of plates?" The answer was really quite simple when we had examined Miss So and So's camera. It was a film camera, with a single lens working apparently at about $f/11$, and with a shutter that permitted of little or no adjustment. Both shutter and lens were designed to give good average results on films of a standard speed under normal lighting conditions, while she used the developer prescribed and provided by the makers of the film. In our querist's camera, however, things were very different. He could use plates of any rapidity, could switch on an $f/4.5$ stop when he liked, and could drive his shutter at any speed from about two seconds up to something like 1-100 sec. The result was that he never got all the conditions right at once. He had all "modern conveniences" available, but really did not need half of them. He was working under modern conditions and producing bad results, while the lady was really working under the conditions of a quarter of a century ago, and getting good negatives.

The fact is, that while the fast plate is a most valuable introduction, it wants knowing, if good results are to be produced on it, and it is used very frequently when it is not needed, and when a much slower plates would serve better. The fast lens is again a most valuable introduction, but very seldom indeed do we need the extra fast lens, and the extra rapid plate together. Very few people realise what can be done with rapid lenses on slow or medium speed plates, yet the combination is a most excellent one for producing good clean negatives.

It should be remembered that, after all, the most critical period in the production of a good photograph is the exposure of the negative. If the negative is indifferent, then by various dodges one may get a passable print at the expenditure of much time and trouble. If the exposure of the negative is not quite as it should be, we may by various developing dodges get a fair negative, but, again, only at the cost of time and trouble. If, however, exposure is right, then development and printing go through almost automatically, and with a minimum of trouble. There are several ways of going wrong in exposure, other than that of merely giving too much or too little time. Supposing the timing to be correct, then a quick lens and slow plate will give a better negative than a slow lens and a quick plate. Stopping down to compensate for too fast a plate is a blunder of frequent occurrence, and one that hardly ever can have an excuse. Again, a very common blunder is expecting to produce a thoroughly good negative from a badly-lighted subject. If the lighting gives a flat and dull appearance to the subject, then the negative will give a flat and dull print, and even the most violent faking will only falsify, not remedy, matters.

In regard to development, the old-fashioned trustworthy pyro was much less prone to give fog than some of the modern developers. Almost any of these will give fine negatives if properly used, but they differ a good deal in their fogging propensities, and, consequently, in the amount of bromide they require. Some pyro formulæ give excellent results without bromide at all, hence, at one time, arose the idea that bromide was an unnecessary complication in any case. Some anti-bromide faddists almost made foggy negatives fashionable, and possibly their influence has extended farther than it should have done. A very material factor in the production of foggy negatives was, however, the introduction of tank development. It need not have been so at all, for fog is not an inherent part of the process by any means. It, however, was some time before tank users began to realise that the use of diluted developers for a long time necessitated the use of extra bromide, and some do not apparently realise this fact now.

Finally, we fear that some of the trouble of bad negatives must be set down to the account of certain people who propounded the false doctrine that the negative did not matter! It was only a means to an end, and so long as they got the type of print they wanted they did not care what the negative was like. We believe that in some cases they had considerable trouble in getting the desired kind of print from the negatives they produced, while in many cases their final results met with little approval from other people. Still, their fallacious doctrine had a considerable effect, and not a little carelessness on the part of negative makers can be traced to the heretic proposition that the negative being only a means to an end is itself of small consequence.

A thing that has often struck us at society meetings is the surprise that many fairly good workers show when they have the opportunity of seeing a really good negative. It seems to be a fact that a large number of photographers really do not know what a perfect negative looks like, and we would suggest that societies holding exhibitions might do good service to their members if they arranged a small loan exhibit of perfect negatives borrowed from first-class workers. It is, perhaps, somewhat unreasonable to expect perfection from those who have no idea what it is like; and a little more familiarity with good negatives might raise the general standard considerably.

Australian War Photographs.—A collection of photographs is being made for the Australian War Museum, similar to that of the British War Museum.

Photographs of the Battle.—Large coloured photographs, taken during the present severe fighting on the Western front, are on view at the Grafton Galleries Exhibition. They illustrate, in the most vivid manner, different phases of the onslaught which the Germans are making against the British lines in France, and will form a notable addition to the collection. The photographs are being enlarged and coloured under the direction of the photographic section of the Ministry of Information, which is responsible for placing them on exhibition.

Oxygen for Lantern Lectures.—Inquiries having been received as to whether sales of oxygen gas for lantern lectures can be made without a special permit, the "Pharmaceutical Journal" has referred the question to the Department of Materials and Priority, Admiralty, Great George Street, London, S.W.1, which controls oxygen supply, and has been informed that as long as the requirements for war and medical purposes are met no restriction is imposed on the supply of small quantities of oxygen in small cylinders to produce the oxy-hydrogen light for lecturing or like purposes; nor, in this connection, is any special permit required at present either for the manufacturer or wholesaler to supply oxygen to the retailer, or for the latter to sell to the public for this purpose.

RENOVATING APPARATUS AND ACCESSORIES.

Renovation is quite distinct from repair. The second deals with strength and serviceableness; the first simply with appearance. As a well-known worker recently remarked to the writer: "I send my repairs out to competent hands, but I do my renovation myself." Some of the hints here given are seasonable in a double sense, as not only helping to give a good impression now that the lighter days begin to show up previously unnoticed dinginess or dilapidation, but as being real war economies.

The materials and appliances needed are of the simplest and most trifling kind. They include a short-handled feather duster, one or two of the sharp-pointed glass-headed pins known as dress pins, a few soft rags, a piece of chamois leather, a tin of Globe polish, another of turpentine and beeswax furniture polish, such as "Mansion," a little benzine or petrol, some machine oil, linseed oil, celluloid varnish, and various colours and stains, to be described later.

The camera may first receive attention. Having removed the lens, flick the apparatus vigorously all over with the feather-duster, especially between the folds of the bellows, both inside and out. Next look for any worn or chipped parts where the colour is lacking. If of solid mahogany, there will probably be none; but cheaper wood, merely stained or veneered, may show light patches. Should this be the case, mix up a little colour to match the darker parts—red ink with a trace of Indian ink added will do very well—or for lighter mahogany a mixture of crimson lake and burnt sienna water-colour—and apply it with a brush or a piece of rag, taking care to do only the portion wanted and to soften off the edges. The principle, in fact, is just the same as that of the retoucher or spotter, namely, to make the conspicuous defect disappear by matching it with the surroundings. Perhaps two applications will be necessary. Allow to dry, then polish by friction with a soft, dry cloth. Now apply the merest trace of the furniture polish to the camera woodwork with a rag and polish off with the chamois leather, doing each part in turn. The result is surprisingly good, and often makes the apparatus seem equal to new. On no account be tempted to use the mahogany "varnish stains" sold for floors, etc. They are excellent for that purpose, but they absolutely ruin the look of a camera, giving it an appallingly red, irritatingly glossy aspect, and being always more or less sticky. For oak and walnut cameras, Vandyke brown water-colour, mixed with a little raw sienna if required, may be used.

The brasswork, if the lacquer is undamaged, will merely need a thorough rub with the chamois leather; otherwise the Globe polish is brought into requisition. The latter is applied sparingly on a flannel with gentle friction, using a fresh portion as the rag gets dirty, until all discoloration is removed. Then polish off with a soft rag. The brasswork may be relacquered, if desired, by brushing with celluloid varnish or "Zapon" cold lacquer. The rack and pinion of the camera should be cleaned out with an old tooth-brush. It may be mentioned here that the dress pins are employed to pick out bits of dirt and grease in wood or brasswork which cannot readily be got at in other ways. The exterior of the bellows may be treated with "Bertha Extra Black," obtainable from the Vanguard Company.

The camera-stand, likewise, may be touched here and there with water-colour to match where portions have been abraded. It should then be rubbed over with a little linseed oil and polished. Clean out clogged-up grease from the screw with benzine or petrol, of course, away from a light or fire, wiping well. Then apply a moderate amount of machine oil. It is wonderful what a difference this makes to a groaning and heavy-working stand. Oil the spindles of the castors also.

The now rather obsolete head-rest, which many photographers still cannot find it in their hearts to get rid of, may be treated with "stove" black. This is suitable, also, for head-screen stands, arc-lamp stands, etc.

Studio furniture is quite revolutionised by the "Mansion" polish, which should be used with discretion, however, so as not to set up reflections. For dark oak furniture linseed oil is better. Accessories of the painted composition type may be touched up with a little oil paint containing a liberal amount of turpentine to make it dry dull. White, with neutral tint or grey added, to make various monochrome shades, will be correct. The same paint will serve to renovate worn foregrounds, or to cover up cracks in back grounds. Try how it dries, however, before using it. If too dull, add more linseed oil; if too glossy, more turpentine. Some of the white paint may be saved to do the reflector of the arc lamp with.

The wooden feet of background stands, etc., look well if given a coat of chocolate colour oil paint, which has good body and covering power, and agrees with almost anything—a fact worth bearing in mind.

Trivial as these suggestions doubtless sound, the improvement effected by such means is out of all proportion to the slight trouble and cost, and must be seen to be believed. A. Lockett.

AN INSIDE VIEW OF KODAK ADVERTISING.

[In the case of an immense photographic business, such as that of the Eastman Kodak Company and its subsidiary firms, in which large and persistent advertising has been a prominent feature, it is interesting to hear something of the principles which have dictated the advertising policy and of the methods adopted at various stages to carry them out. Such an inside view of the methods of the Kodak concerns in advertising their goods is afforded by the account of an interview with Mr. L. B. Jones, advertisement manager of the Eastman Kodak Company, which appears in the current issue of "Printers' Ink," the New York journal for advertisers, which in the scope and interest of its matter takes perhaps the leading position among periodicals of this kind throughout the world. The article, by Mr. Bruce Bliven, shows how the keynote of the Kodak advertising policy has been maintained by Mr. Jones throughout more than a quarter of a century, how, too, it has undergone variations in correspondence with the many descriptions of the Company's goods.—Eds, "B.J."]

After all is said and done, you can't really know much about any given advertised business until you know something of the man who aims the advertising gun and pulls the appropriation trigger. Acting on that theory, "Printers' Ink" the other day started the writer off on a Little Journey, as it would be called in elberthubbardese, to turn a reportorial searchlight upon a Certain Man who is advertising manager for a certain widely used product.

It was on the twenty-ninth of April, 1892, that this man, then a youthful bookkeeper in a lumber yard in a small town, climbed down off his high stool, shook hands all round and said good-bye. On May 1 he started in as advertising manager for a manufacturer in a near-by city, who was already using national advertising, and planned to use more.

That advertising manager *has been there ever since.*

At this point, we suggest that the reader might call weakly for help, and faint away. An advertising man—and a real one, by all the powers!—holding down his job for twenty-six successive and indubitable years! It can't be done! Or, if it can, it most certainly is not customary, to say the least!

Assuming that the reader has been resuscitated, let history march on. When their present investigator sidled into the office of Lewis B. Jones, advertising manager of the Eastman Kodak Company, and President of the Association of National Advertisers, with the suggestion that an interview would be interesting, Mr. Jones shook his head.

"You don't want to interview me," he observed. "A man who's been in one job twenty-six years has no interesting story. You want to go and look at one of these peripatetic advertising managers, of the well-known grasshopper school. They have biographies which are simply bursting with facts. All I've done is help sell Kodaks. And film."

The interviewer, having gently disagreed as to the usefulness of the Mexican jumping bean in the advertising profession, kept on fishing. He wanted to know, for instance, something of the progressive development of the Kodak advertising since 1892. Had the passing years changed the basis of attack? Or do people nowadays still respond to the same old lure?

Developing this mammoth business from a modest "standing start" has been a very simple matter, to hear Lewis Jones tell it. "From the very beginning down to this day and hour there has been just one purpose in Kodak advertising: to sell the *idea of photography*, the art of making pictures. Everything else is subordinate to putting across the pleasure of kodakery. If we show a picture of the instrument itself, it is only so that the purchaser may know in advance what it looks like. Almost the first advertising which was run (it went on the market in 1888) showed the picture of a father down on one knee bent over the Kodak taking a picture of his little daughter. And right here I want to make it plain that Mr. Eastman, who then gave much personal attention to the advertising, realised fully that it was the charm of photography, not merely his little twenty-five-dollar black box, that must be sold to the public. Another of those early pieces of copy was a picture of a man riding an old-fashioned high-wheel bicycle, snapping views as he went along." (That sounds like an acrobatic impossibility, but is reported by L. B. J. not to be particularly difficult.)

It is worth recording in passing that when you are with Mr. Lewis Jones it is hard to believe that he is competent to speak with authority on conditions twenty-five years ago, except the sort of things that Huck Finn knew all about—the old swimmin' hole, making willow whistles in the spring of the year, the robber band with their cave down by the creek, and one old cat. If one were writing a movie melodrama about him, a very good title would be, "The Most Youthful of the Veterans." A crop of thick, wavy black hair; a lean, tanned face with friendly eyes behind thick lenses; a mobile, quizzical smile, and a brusque, youthful military moustache, are some of the items which sum total into this impression. Like a good Indian, he thinks fast but talks slowly; never smiles without meaning it, but means it often; and takes it for granted that people are human beings unless they prove themselves otherwise. And he can make a speech on the right occasion that gets you going.

The subtle appeal to the "human values" of photography, which was worked out in that early advertisement showing father and daughter, is reflected just as strongly in the advertising copy of last week and next. The other day a battered envelope came to Mr. Jones's desk, defaced with the smeared blue mark of the censor. Within was a page Kodak advertisement torn from a magazine, showing a soldier sitting in the door of his "pup" tent, looking at some snapshots of the folks at home. In a few words, the copy accompanying the picture suggested that views of the places and friends he has left behind are what the soldier likes best of all to get. The idea evidently went straight to the heart of one young "Amex" painfully learning, three thousand miles from home, to throw hand grenades at the Boche; for he had scrawled along the margin of the page: "This is the most truthful advertisement ever published!"

"When we can get responses of that sort we feel that our advertising copy is down to bedrock," Mr. Jones remarked. "And that is what we are continually striving for—to get an air of *reality* into our work which will make the reader feel the humanness of it all, and will cause him to respond to it because of his own experiences. Several years ago we were playing up 'the Kodak girl' in our copy, showing a photograph of a very pretty Miss with her camera, and emphasising the catch line: 'Take a Kodak with you.' For some time I was not sure as to whether that advertising was the right thing or not, but one day I heard something which immediately convinced me it was. I discovered that they had a saying at Yale to this effect: 'To h—l with the Kodak'—Take the girl with you!' I knew at once that that advertising was at any rate strong enough in personality and reality to 'drive home' into the consciousness of the college boy; and if it could do that, it was also reaching other people, and therefore selling Kodaks."

The series of advertisements featuring "the Kodak girl!" was, like all the Eastman copy, planned to fulfil one very definite requirement which might fairly be termed Article One in the Jones advertising creed: *the picture*, if one be used at all, *must tell the story*, all alone. There are only four words in the current Kodak copy, already referred to, and strict economy could have eliminated even these, for four hundred or forty thousand words couldn't make the message any stronger. As Mr. Jones points out, you don't even have to read English to get the full force of such an advertisement as that. Just as the heathen Chinese or the darkest Hottentot can sit in the movie theatres of those far-off lands and enjoy the absurdities of Charlie Chaplin, unhampered by the fact that all the titles flash upon the screen in an unknown tongue, so the illustrated advertisement, speaking the universal language, drives its message home to every one with eyes to see.

Every advertising man has probably noticed the keen news sense which is shown in the Kodak copy. This was never better illustrated than at the beginning of the present war. Hardly had the telegraph wires stopped humming with the announcement of America's declaration of war before the Eastman advertising had begun to mobilise in military atmosphere, with the appeals which we have already mentioned. In fact, the first copy which went out even departed from the standard of Kodak practice, which is always to use photographic illustrations. Wash drawings were shown in those first overnight ads, and were quickly followed by photographs from posed models in uniform. These, however, did not somehow get the right smack of army life—they were a little too smug, perhaps, and too "slicked-up." Before very long the pictures of real boys in real khaki began swarming in, and then it was merely a question of getting the right text and the right picture together.

This keen "nose for news" and sense of what is dramatic and in the public eye is very probably a heritage from Mr. Jones's youthful days as a newspaper man. As early as 1887 he was inoculated with the virus of printers' ink, serving as baseball reporter on the Rochester "Democrat and Chronicle." He was succeeded on that job, incidentally, by a young man named Samuel G. Blythe, who has since reported other things hither and yon to an extent which has made him quite well known. Jones went from Rochester to the old (morning) "Chicago News," where he sat not infrequently armchair to armchair in the hasty-eateries with a hard-working and youthful reporter named Peter Finley Dunne. From time to time the coming advertising manager turned his wandering steps back to that lumber yard near Rochester, where he would work until he had accumulated something of a cash reserve, whereupon he hied himself to the halls of learning. His school-learned mathematics he turned to good account on the lumber-yard's books, thus demonstrating anew the efficiency of Dickens's famous "Dotheboys Hall" system of education, wherein a boy spells window w-i-n-d-e-r, and then goes and washes one. Between whiles Jones worked on a farm, and ingrained into himself a love of the country, of good cattle and blooded horses, and the healthy, simple things which begin, in our American life, about where the asphalt pavements end. This love of the out-of-doors still survives, and is either the cause, or partly the result of, the Jones farm not far from Rochester, where there are cattle walking about the pasture which are worth more per ounce than most cattle are worth per pound, on the hoof or off it.

Early Illustrations in the Advertisements.

His nose for news led Jones to begin to advertise the Kodak with pictures of timely interest, long before it was practicable to use photographs in copy. For the first nine years of his work with the company line drawings were relied upon, for the simple reason that in 1892 it was next to impossible to get satisfactory half-tone cuts for reproduction. In 1901 the first photographic illustrations were used showing a model "shooting up the scenery" with her Kodak. These worked out fairly well, but about that time the Eastman Company decided to go into colour pages in the magazines, and as soon as an attempt was made to colour the photographs trouble ensued. The pictures came back from the engraver's art department blazing with all the bright colours that are known to the flowers that bloom in the spring, and some that the flowers wot not of. These bright colours destroyed the effect of naturalness, took away the photographic element of truthful portraiture for which Jones was working. Also the problem of getting good colour-plates which would register correctly and yet not overshadow the photograph with the art work, was a very serious one in 1901. Therefore, the photograph of a posed model was reluctantly laid aside in favour of paintings in oil or water-colour of the same subjects. Some of America's best known artists have wet their brushes or squeezed colour tubes to help make Kodak advertising interesting. Among them are Jessie Wilcox Smith, A. B. Frost, Alonzo Kimball, T. K. Hanna, Edward Penfield, C. A. Gilbert and Frederick Remington. Jones speaks with particular pleasure of the work done by the last-named, and the interest it created.

As time went on, the engravers learned more skill in making plates for multi-coloured reproductions of photographs; and the technique of bringing out the picture was also studied closely by the Kodak advertising department itself. Presently it was discovered that if very light tints were washed in—preferably in water-colour—over the face of the photograph, and if the key plate were printed in black, to bind the whole thing together, a very happy result was secured. From that day to this, with the exception of emergencies such as America's entry into the war, the Kodak advertising has always used photographic illustrations; proving that if consistency be a jewel, as the bard remarked, Jones by now has accumulated enough jewels of that variety to set up shop and compete with Tiffany on very even terms.

Probably many advertising men have wondered where some of the snapshot pictures used by Kodak in its advertising come from; for they often have a happy spontaneity about them which proves—or would seem to do so—that they are not the more or less laboured product of the professional studio. The guess is correct, and the reader may go to the head of the class. These pictures are contributed by volunteers, devotees of photography and many of them amateurs. A yearly competition, with prizes aggregating 3,000 dollars, helps to keep the interest keen. The contest is announced, and is "played up" in the little magazine called *Kodakery*, which is sent free for one year to every purchaser of a Kodak. This magazine has a circulation at present of 250,000, and quite a goodly number of those who get it free for a year subscribe for it annually thereafter.

The publication of this little magazine fits snugly into the whole general plan of Kodak exploitation as Jones sees it—and a mighty interesting plan it is, too. Here is his analysis of the problem he has to meet:—

"If we could sell Kodaks and photographic equipment only to so-called 'camera-bugs,' people whose hobby is taking pictures, we'd have mighty small annual sales, for the number of such persons in the country is very sharply limited. Therefore, we must reach, not the person who is interested in pictures *per se*, but the person who is interested in something else, and wants pictures of that. It may be a yacht, or a summer cottage, or the sport of mountaineering, or an automobile. Whatever this master-enthusiasm is, we have to sell the devotee a Kodak as a necessary adjunct to the proper enjoyment of it. A camera as a camera may mean less than nothing to him; but pictures of his ice-boat? Ah, that's different!

"Is there one big overshadowing interest which is responsible for more buying of Kodaks than any more?

"There is—*Children!*

"Do you own a Kodak?" he demanded of the interviewer.

We grinned, and admitted the impeachment.

"Why did you buy it?"

"Well—there was a rather pink young man—eleven pounds—who came to board with us some time ago, and his mother said that . . . baby record book . . ."

"You see!" said Jones triumphantly. "Children are the cause of the purchase of a vast quantity of photographic apparatus. Next to them comes travel—in the old ante-bellum days no one ever thought of doing a Cook's tour of Europe-in-a-hurry without a Kodak. It is very fortunate for us that matters are on this footing. If photography were a hobby in itself with our customers, there would always be a danger that they would soon drop it and go on to something else. As it is, however, they may shift from one recreation to another a dozen times, and the Kodak fits into every one. As a poetical friend of mine once remarked:—

"'Ping may come and pong may go—
Kodak goes on for ever!'"

Photo-Finishers Trained by the Company.

Viewing the matter in this light, it is natural that the Eastman Company should feel that its work is by no means ended when it has sold the would-be picture-maker his apparatus. Having advertised the pleasure of taking *good* pictures, they want to insure the production of work of that order, in so far as it is possible. That is where *Kodakery* comes in, with its month-to-month discussion of the technique of picture-taking. The instruction book which comes packed with the Kodak is also a marvel of compact and clear-cut information on the subject. And in order that the prints made from the negative shall be as good as they can be, a campaign of education has long been in progress directed at the dealer in photographic supplies, who is usually the man who does the work of developing. The Eastman Company maintains a school of instruction in all phases of the technique of picture-taking, developing, and printing, and to this any dealer may come himself or send any of his employees to spend as much time there as he or others like without any charge for tuition.

The educative work done for the Kodak user must not be construed as in any sense an attempt to "trade him up" and get him to buy more and more expensive equipment. Rather is it the aim of the company to help its customers to make good pictures with the equipment that they have. Of course, it is true that nearly every amateur photographer goes on to more complicated cameras, capable of doing better and more difficult work.

"Brownies" as an Educative Force.

"Our Brownie cameras for the use of children have educated a whole generation of American youngsters in the use of photographic equipment," Mr. Jones reports. "We have always sold these cameras at a very close margin of profit, believing that it was the best possible situation for us to have the children acquainted with picture-making, so that when they grow up it will not be a foreign question to them. The photograph album which we put out some time ago, and advertised quite extensively, was another item on which we had a very narrow margin—in fact, you might say, none at all. However, we knew that people with an album in which to keep their pictures would be more interested in continuing to use their equipment than those whose pictures are allowed to accumulate in helter-skelter fashion. Since we sell film as well as Kodaks, we not only want to see people buy our instruments, but use them."

The "double motivation" here hinted at has been present in very much of the Eastman advertising. For instance, the famous series of advertisements suggesting that you get your picture taken, with the slogan, "There's a photographer in your town," not only increased the goodwill of the photographers for the company, but resulted in increased use of plates and film among the professionals. Letters are still coming in to Mr. Jones from grateful photographers expressing their appreciation of the assistance thus given them; and in some cases local advertising campaigns, either by individuals or by associations of studios, have been engendered because of the convincing demonstration of the power of advertising which the Eastman copy furnished.

The number of appeals which have to be made accounts for the fact that Kodak advertising has developed not one, but several, hard-worked slogans: "If it isn't an Eastman, it isn't a Kodak"; "Take a Kodak with you"; "There's a photographer in your town"; "Your friends can buy anything you can give them—except your photograph"; and, "You press the button—we do the rest." Incidentally, it is Mr. Jones's keenest regret, so he says, that he can't claim the credit for being the originator of the last-named line. Mr. Eastman himself wrote it one day way back in 1890 or '91, after much pondering over the problem of expressing briefly and in memorable fashion the ease of using the Kodak (which, in those early days, was often regarded by the layman as an intricate and complicated affair, far beyond the skill of the average individual who has only enough engineering knowledge to operate a wheelbarrow).

There is probably not another national advertiser using so many slogans as this and exploiting each so widely. Each of these, of course, was produced to meet fairly and squarely some one condition in the kaleidoscopic struggle of day-to-day merchandising. "Take a Kodak with you" helped to popularise the instrument among travellers, who thus became devotees of the pleasant picture sbit. Two others of the group were designed to help the professional photographer, as we have said. Perhaps most interesting of all is the fact that "If it isn't an Eastman it isn't a Kodak" is used as a preventive, is the heavy artillery in a never-ending battle to keep the public from thinking that Kodak is a generic term which might mean any old picture making device. To save the coined word from the effects of its own popularity—a popularity the Eastman Company has spent millions to create—several ads a month appear pointing out the fact that Kodak is not a synonym for camera.

List of Publications.

Inasmuch as the Eastman Company is one of the largest buyers in this country of the commodity jocularly known as white space, there may be keen interest for sellers of that commodity, as well as others, in knowing how Mr. Jones determines whether or not any given publication shall be added to his list. His first question, naturally, is "How much circulation has it?" but this is followed so immediately that the two questions are practically simultaneous, by, "How did you get it? What subscription methods were employed?"

This does not mean for one minute that he condemns any subscription method as being wrong in any abstract sense. It only means that he believes there are some solicitation methods which do not have a tendency to seek out among the reading public the sort of persons to whom Kodaks will appeal. The same point is uppermost in his mind in connection with the third question, which is, "Where does it go? Who reads it?" If the answers to these three questions "listen well," Mr. Jones himself secures a number of copies of the publication and reads them, so that he may judge for himself of the editorial character, and decide whether the class of readers claimed for it would probably be interested in a periodical of its character. If these tests are all met squarely, and if the rate is satisfactory, the battle may be considered as almost over.

At this point the interviewer cleared his throat, which always indicates an unusually important question. "What, Mr. Jones, is your theory of successful copy?" he inquired.

"I don't know that I have any," smiled Mr. Jones thoughtfully. "We have always just tried to think what the people would like to see, and show them that. After all, that's about all there is to advertising, isn't it? Find what the people are interested in, and then play that up. As to copy, I am a heart and soul adherent of the gospel of brevity. Make it short—but tell the whole story. Write out everything you have in your mind on a subject, and then keep on blue-pencilling till every superfluous word is gone. I am deeply interested about the honest advertising movement, of course; and I think that every means of approach—legislation, persuasion, education—should be used in bringing all advertisers into line; but most of all I believe in giving advertising the human touch. These ideas of mine are just common sense, after all—no magic or mystery about them. In fact," he smiled, "we are running a sort of Obvious Adams advertising department, or trying to."

Probably that is true. The writer has always been of the opinion that you can't have too many men of the Obvious Adams type in business anyhow, and he came away from the interview with the firm opinion that you can't have too many men with the business vision, and ability to put that vision into practice, possessed by Jones of Kodak.

Bruce Bliven.

* * *

Royal Institution.—Among the afternoon lecturers at the Royal Institution after Easter are:—Professor John Joly, two Lectures on Scientific Signalling and Safety at Sea; Sir Isambard Owen, two lectures on Rheims Cathedral; Lieut.-Colonel Sir Francis Younghusband, three lectures on The Abode of Snow, its Appearance, Inhabitants and History; Professor H. F. Newall, two lectures on Modern Investigation of the Sun's Surface. The Friday meetings will commence on April 12, when Professor E. C. C. Baly will deliver a discourse on Absorption and Phosphorescence. Succeeding discourses will probably be given by Major G. I. Taylor, Sir A. Daniel Hall, Sir George Greenhill, Professor F. Gowland Hopkins, Professor A. [illegible] Beadle, Sir Boverton Redwood, and other gentlemen.

DEATH OF MAJOR C. D. M. CAMPBELL.

Although the names of executive officers who have been responsible for the very great development of photography in aerial operations are little known to the general public, many of those in photographic circles were acquainted with the personality of Major C. D. M. Campbell, news of whose death, on March 9 last, has only just reached us. At the outbreak of war Mr. Campbell was associated with the firm of Messrs. Walshams, Ltd., commercial photographers, as a director and commercial representative. In its very early days he accepted a commission (in what regiment we do not know), and was given the opportunity of taking a share in such application of photography as then existed. He was in France in 1914, and appears, from what we can learn, to have been one of the first to press forward the use of the camera in aerial reconnaissance, and, in fact, is said to have himself taken the first successful military photographs from aeroplanes early in 1915. At any rate, before many months he was at the head of the photographic section of the R.F.C. in London, and was rendering invaluable services in the design of apparatus, the control of its manufacture, the organisation of equipment and the training of staff. We had ourselves personal evidence of the assiduity with which he prosecuted this work at the time when lenses for aeroplane cameras were difficult to obtain. With the great growth in the organisation of the photographic section of the R.F.C. Major Campbell was throughout intimately and responsibly associated, and there can be no reason to doubt that the continuous strain of this important work eventually led to a collapse of his somewhat delicate health at the age of only thirty-five. Towards the end of last summer he visited the United States on a mission undertaken for the purpose of passing on the experience acquired in the organisation of the R.F.C. Photo Section to the American Flying Corps: a second visit to America, recently about to be undertaken, was stopped by the breakdown in his health. As in the case of many another officer, the work which he has accomplished is comparatively little known in civilian ranks, but it has had one testimony, in the shape of the honorary fellowship which was conferred upon him some two years ago by the Royal Photographic Society.

PORTRAITS OF CHILDREN.

(A note in the "Photographic Journal of America.")

Few better opportunities for the attaining of charming studies by photography are ever brought before the camera worker than that presented by the interesting subject of child portraiture.

The photographer who possesses a genuine love for children and a keen appreciation of the many little things that only children can do and say has his way already paved for him to success. Particularly so is this the case if he add to these qualifications an abundant supply of patience and the faculty to grasp and take advantage of the [illegible] happy situations that his little subjects unconsciously fall into while at play before the camera.

At the outset the first step necessary is the securing of their confidence. This can readily be obtained by displaying a little tact in approaching them. The best way is to take them quietly at the beginning, and avoid plying them with too many questions if a tendency to shyness asserts itself. In fact, it is much better to leave children of this type to themselves for a time until they become accustomed to the surroundings and the strangeness wears off. When this point is reached, by interesting them with the explanation of some new toy or the like, their attention will be diverted and the fact of your presence gradually forgotten, or, at least, accepted as a necessary evil.

The common error made by many operators in handling children is that of approaching them too abruptly. Although it takes a little more time at the commencement, it is far better to devote a few minutes longer at this time, cultivating your little sitter and working him into the proper frame of mind necessary for the making of a pleasing portrait, before the camera is even touched. Once you have his good will and have been accepted as a new found friend, the rest will be plain sailing. His interest must be held, however, and quick work done while you still command his full attention. Better make few plates while you have him in this interested state than to prolong the sitting after he has become visibly tired and restless.

Unless an unusually intractable case presents itself, the actual time consumed in securing the different positions is but a matter of few minutes; the point is getting him in a desirable state of mind first, and then losing no time in making your negative while the spell is on.

When a little fellow is brought into the studio for a sitting we usually adopt the following method : After the customary grooming that always is deemed necessary by the anxious nurse or attendant, he is ushered into an apartment fitted up expressly for his reception. In this play-room he is allowed full swing and amuses himself in various fashions until we are ready for his sitting. It is among these surroundings that we first make his acquaintance, and as much time spent with him here as is considered sufficient to secure his interest in what is promised to follow. Very little trouble is experienced with the majority of subjects, after explaining to them a brief outline of what will be expected of them, to get them to enter in the full spirit of the undertaking. Occasionally, when a stubborn child is met who absolutely refuses to be swayed by your choicest blandishments, rather than disturb his equanimity, his sitting is made right here in this room, which is in reality a smaller operating-room. But instances of this kind are rare. Meanwhile, the larger studio has been prepared, background and accessories placed in readiness, and the camera, which is closed in to resemble a bookcase, stands in position with the slide drawn. When the young hopeful is led in, but little urging is required to get him to occupy the space arranged for him; this is usually by a small chair or table upon which some article liable to prove of interest is placed in order to attract his attention.

Frequently a number of poses can be got while he is thus amusing himself and is quiet for the fraction of a second required for the exposure. Mechanical toys interest children greatly, and by having a good collection on hand some one of them will particularly strike his fancy and be the cause of calling forth a variety of expressions ranging all the way from a smile to a yell. Once in a while a subject comes along who has passed the stage of being attracted by toys; it is then that a good stock of little stories or the knowledge of a few simple tricks will likely prove of advantage. We have had youngsters who have put us to our wits' end in studying up some scheme in order to arouse them into some degree of animation without result, and then, accidentally, before our stock of patience had entirely left us, stumble across some little trifle that we had previously overlooked which would have the effect of arousing them instantly into a being of life and action. One little fellow I have in mind, who gave us a severe tussle after trying every conceivable object, only gave signs of possessing an intellect when his mother happily remembered his great fondness for pins, and supplied him with a saucer full. It is needless to add that the proofs selected were from the plates made after the pins appeared.

While almost the entire success of a child's portrait depends upon securing a natural and suitable expression, the effect of light and shade, composition, and arrangement must be taken into account before the production can rank as an artistic piece of work. Backgrounds and accessories should be kept simple and unobtrusive, avoiding the introduction of any lines that would detract from the importance of the figure. We find that more satisfaction is gained from the use of plain light grounds and keeping the accessories, if any are to be used, of a character similar in tone.

As children are usually gowned in light coloured material, the result of this arrangement masses the lights in the picture, and brings the only darks about the head, where the interest should be centred. An effect of this kind has a dainty appearance quite in harmony with the characteristics of the little people represented.

The question of allowing the friends and relatives who frequently accompany a child to assemble in the studio at the time of sitting is a much discussed one. Whether it is advisable to let them stay depends entirely on the people themselves. Sometimes they can render valuable assistance, but more often their presence has the effect of dividing the child's attention. When it is impossible to exclude them without offending, the better policy is to make the best of it, and direct their efforts to where they can be used to good account. Outline your plans to them quietly and briefly, and caution them to appear only when instructed to do so. If you go about your work in a thorough manner they will soon have confidence in your ability, and realise that to interfere would be to jeopardise the success of the sitting.

Notwithstanding the many drawbacks and petty annoyances constantly met with in the portraiture of children, personally I derive more genuine pleasure in photographing these little people than in all the other branches of the art combined. Once in a while, after an unusually trying ordeal with a real tartar, I am about ready to take part of this back, but probably the very next little tot will be a perfect jewel, and more than make up for the shortcomings of his predecessor, and serve to strengthen my convictions all the more. To the photographer with a responsive chord to all the winning traits that childhood is capable of, their coming and going will be remembered as just so many bright spots during the day's work, instead of the bugbear it often appears to some

O. H. Bohe.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Labour Wastage.

When a business man is buying or selling a commodity, besides considering himself and the other party, he usually pays attention to the article itself. Whichever way the coin is passing, he wants equivalent value, *plus* profit, for what he parts with, and to ensure getting this it is necessary to study the goods.

The professional photographer as a business man is not as keen on the profit as he might be, otherwise he would study the goods more than he usually does, the goods referred to being materials, gas, electricity, and labour. It is labour that this article has to deal with, it being the one thing we all sell, while some also buy it; it is also a commodity the transfer of which is often accompanied by loss to one or both parties.

The engagement of an incompetent employee, who shows no desire to become competent, is a losing deal on each side. Were the employer to study the other's goods sufficiently, he would not buy; were the employee to do likewise, he would not endeavour to sell, for though he may appear to be doing well by obtaining "money for dirt," his foothold is precarious, and his prospects very poor until he shakes up his ambition and changes his principles. It is, of course, a difficult matter for a master to gauge anyone's ability from a letter or an interview, and sometimes an applicant will be taken on trial, but when a trial hand turns out a failure, why is it that so often nothing happens? He or she hangs on, and neither employer nor employed seems to make any serious endeavour to improve the goods that the one buys and the other sells. The result is that time and materials are wasted, the boss paying for them, while the assistant's future outlook cannot be very brilliant; the present services are, perhaps, being sold at a profit, but are they ever going to demand an advanced price?

When a genuine "efficient" is employed, it is sometimes the case that, by keen business management, his labour is made the very most of. Definite working hours, up-to-date tackle, and every facility for using the same; a comfortable atmosphere and every inducement to look lively and turn the work out with quality and despatch, will result in a handsome profit on the assistant's labour after an adequate wage has been paid for it.

On the other hand, skilful operators have been seen messing about the workrooms at jobs they were neither extra good at nor interested in, when there was work for them in the studio. Waste on both sides. A wise owner would not permit, much less order, a smart operator to work elsewhere than the studio when there was operating to be done, and a wise operator would not leave the studio at such a time.

Another way in which loss is incurred is inattention to the overtime system where it is in use. A certain employer, whose workrooms were open very late, made a point of paying for all work done after a certain hour. A fair and businesslike arrangement, but sufficient notice was not taken of the working of it.

The majority of the staff certainly took no unfair advantage of this laxity, but started at 9 a.m. and worked hard all day, only stopping over when necessary.

One worker, however, thought that, by lagging in ordinary hours, and pulling his work up in overtime, he would make more money; and for a time he actually did so, the boss believing this particular hand to be the hardest worker he had; but his secret leaked out, and he lost his lucrative job.

A more careful and an earlier inspection of that worker's wares would have saved the buyer some pounds and the vendor his market. By studying the goods well before buying the master will get the best for his money; by studying what he has already bought he may improve the quality; while the worker who keeps a critical eye on his wares can confidently stick out for their value, and at times improve that value, all of which is in the interests not only of economy, but of the profession.

When labour receives its full share of intelligent consideration, the buyers and sellers of that commodity will profit, and waste will not be such a big item. Furthermore, the status of the photographer will assume a position higher than that to which some accredit it at present.—**Thermit.**

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications March 11 to 16.

Stereo-Cinematography.—No. 4,518. Screens for stereo-cinematographic projection. G. W. Bryant and F. Heale.

Cinematography.—No. 4,625. Cinematograph machines. E. Schieroni.

Cameras.—No. 4,498. Photographic cameras. C. M. Williamson.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Four Lens Air Space Anastigmats.—No. 113,590 (Nov. 27, 1917).—The invention relates to an improved photographic objective corrected spherically, chromatically, astigmatically and comatically, of the type consisting of four simple lenses separated from one another by air spaces, the two halves being unsymmetrical and each half consisting of a positive lens of crown glass of high refractive index and a negative lens, and the space between the positive and the negative being of the shape of a positive meniscus.

Objectives of this type are constructed on the principles discovered by H. D. Taylor and described by him in Patent Specifications Nos. 22,607 of 1893 and 15,107 of [illegible]. A symmetrical four lens objective was described in Patent Specification No. 12,859 of [illegible]. The symmetrical type has obvious advantages from the manufacturer's point of view, but calculation shows that it will not yield a first-class objective of large field and wide aperture.

Recent investigations of objectives consisting of four simple lenses have discarded the symmetrical type. Patent Specification No. 22,400 of 1910 describes such an objective depending for its corrections on the use of four lenses of the same refractive index for the principal colour. Rigorous computation shows that a substantial improvement can be obtained by departing from such a limitation of the refractive index. For an objective of aperture f/4.5, for example, the widest anastigmatically flat field is obtained only by making the negative components of glass of the lowest available refractive index consistent with the degree of dispersive power required.

Patent Specification No. 833 of 1913 describes an objective consisting of four simple glasses in which the coma aberration is corrected by making the two surfaces of each negative lens of different curvatures and placing them unsymmetrically with respect to the diaphragm, one of them presenting its deeper curve and the other its shallower curve to the diaphragm. Rigid calculation shows that, by a different arrangement, a substantial improvement is obtained in the correction of astigmatism, field curvature and coma.

The method of the present invention is to arrange both negative lenses as well as both positive lenses with their shallow faces turned towards the diaphragm. This arrangement necessitates a shallower curve for the inner surface of the back positive lens, which reacts very favourably on the field curvature and astigmatic aberrations at the margin of the field, and at the same time yields a high degree of coma correction throughout the field.

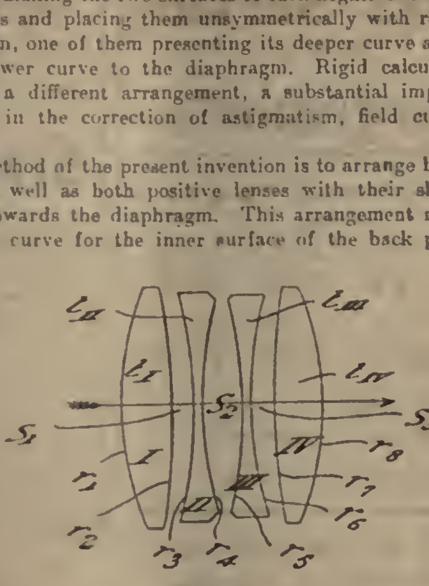

Fig. 1.

Fig. 1 is a diagrammatic illustration of one form of example of a photographic objective constructed according to the invention and showing the relative positions, curvatures and thicknesses of the lenses composing the objective: Fig. 2 is a similar illustration of a second example.

The constructional data for the two objectives illustrated are given below. Both are specified in terms of unit focal length. The sign convention used is that + is attached to surfaces convex towards the incident light and − to surfaces concave to the incident light.

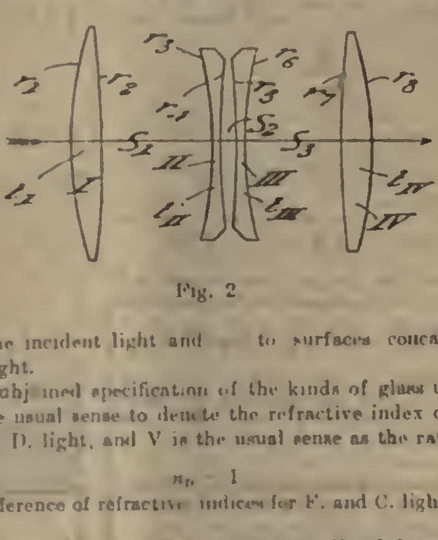

Fig. 2

In the subjoined specification of the kinds of glass used n_D is used in the usual sense to denote the refractive index of material for sodium D. light, and V is the usual sense as the ratio.

$$\frac{n_D - 1}{\text{Difference of refractive indices for F. and C. light}}$$

Example 1 (Fig. 1). F/4.5 Equivalent Focal Length 1.00.

Radii		Thicknesses & Air Spaces.	
r_1	+ ·2976	t_I	·0455
r_2	− ·8152	S_1	·0203
r_3	− ·4285	t_{II}	·0100
r_4	+ ·4464	S_2	·0362
r_5	− ·5041	t_{III}	·0100
r_6	+ ·4330	S_3	·0193
r_7	+ ·8152	t_{IV}	·0455
r_8	− ·2976		

Kinds of Glass.

I	$n_D = 1{\cdot}6116$	V = 56·4	Dense baryta crown
II	$n_D = 1{\cdot}5682$	V = 43·4	Light flint
III	$n_D = 1{\cdot}5502$	V = 45·8	Light flint
IV	$n_D = 1{\cdot}6116$	V = 56·4	Dense baryta crown

EXAMPLE II. (Fig. II). F/4.5 Equivalent Focal Length 1.00.

Radii.		Thicknesses and Separations.	
r_1+	·3409	t_{I}	·0257
r_2−	4·081	S_1	·1089
r_3−	·4143	t_{II}	·0090
r_4+	1·049	S_2	·0142
r_5−	14·40	t_{III}	·0090
r_6+	·3698	S_3	·0909
r_7+	1·336	t_{IV}	·0265
r_8	·3352		

Kinds of Glass.

I	$n_D = 1·6116$	$V = 56·4$	Dense baryta crown.
II	$n_D = 1·6206$	$V = 36·2$	Heavy flint.
III	$n_D = 1·6206$	$V = 36·2$	Heavy flint.
IV	$n_D = 1·6116$	$V = 56·4$	Dense baryta crown.

Example I. attains a wide field highly corrected for the aberrations of coma, astigmatism and curvature at an aperture of f/4.5 by the use of highly refractive baryta crown glass for the positive lenses and of light flints of medium refractive index for the negative glasses.

Example II. shows the invention applied to a design intended for objectives of long focal length in which it is necessary to attain a very high degree of correction of the aberrations over a field of moderate extent. In the particular example quoted, the negative lenses are made of material of refractive index higher than that of the positives. This is immaterial to the application of our invention. If one of the negative lenses were made of material of somewhat higher, and the other of material of somewhat lower, refractive index than that of the positive lenses, a compensating effect could be obtained by suitable adjustments of the various curvatures and air spaces. As in Example I., the essential points to secure a high degree of correction of the several aberrations are those embodied in the invention—*viz.*, the employment of highly refractive material for the positive lenses and the favourable distribution of the unsymmetrical curvatures, so that all the four glasses turn their surface of least curvature towards the middle air space.—Arthur Warmisham and Taylor, Taylor and Hobson, Ltd., Stoughton Street Works, Leicester.

Trade Names and Marks.

REGISTRATIONS RENEWED.

ESTONA.—No. 263,783. By the Birmingham Photographic Company, Ltd., in 1904. (Class 39.)

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SATURDAY, MARCH 30.

Huddersfield Naturalist and Photographic Society. "Some Birds and Their Nests." J. C. North.

MONDAY, APRIL 1.

South London Photographic Society. Annual Meeting.
City of London and Cripplegate Photographic Society. "The Toning of Bromide Prints." J. J. Butler.

TUESDAY, APRIL 2.

Monklands Photographic Society. "Photography" Prize Slides.

WEDNESDAY, APRIL 3.

Edinburgh Photograohic Society. "The Negative." W. Lawson.
Photo Micrographic Society. Members' Evening.

THURSDAY, APRIL 4.

Huddersfield Natoralist and Photographic Society. Lecturettes by Members.
Hammersmith (Hampshire House) Photographic Society. "Some Further Experiments on the Polarisation of Light." F. C. Reynolds.
Liverpool Amateur Photographic Association. "River Scenery of S.E. Ireland." Mr. O'Mahony.

FRIDAY, APRIL 5.

Rodley and District Photographic Society. Members' Night.

CROYDON CAMERA CLUB.

THE club reporter, to embody the language of the secretary in the syllabus, "lacerated the feelings of members by looking backwards at the noble past of the club, through the fantastic mirage of his own reports." The "noble past" is, of course, a figment of imagination, and the concluding words convey a wrong impression, as the reports, however deficient in other respects, have faithfully mirrored the salient features of the proceedings as seen through the atmosphere of the club's eccentric personality. Despite an effulgent moon and a still night, the attendance was excellent, old friends—some from a distance—turning up in force.

There is a certain grim humour in reporting oneself, with a temptation to burst into panegyrics on the one hand, and, on the other, to rebuke and reprobate to such an extent as to offer a pleasant prospect of securing damages for libel. However, the history of the club is impersonal, but can hardly be said to be possessed of much interest to other than its members. Since the year 1890, when the club was founded by Mr. Hector Maclean, it has included in its ranks many well-known workers, but of original members only three remain. In common with other societies, it has experienced vicissitudes, the most serious crisis—one of a financial character—occurring in 1904, when the situation was saved by its then secretary, Mr. H. M. Bennett. The appearance of the youthful Mr. C. E. K. Mees (since "doctored") marked a distinct epoch, and in his early enthusiasm to advance knowledge and remove errors of thought, he nicely pounded the pundits, who, at first, failed to be sufficiently grateful for the attention bestowed upon them. Although in those days Dr. Mees had a sound grip on the scientific side of photography, in actual craftsmanship he was decidedly open to improvement, which the "blooming practical," with great candour, if not brutality, never failed to rub in and apply salt with the administration. Soon that stage passed, and when he departed for America all realised the ugly gap caused, and deplored the loss of a highly esteemed comrade ever ready to do his utmost for the club. Shades of memory! How he used to give it to the reporter! who occasionally got some of his own back in various discreditable ways! A most strenuous endeavour, extending over years, to get the price of dry ginger-ale raised for the doctor's special benefit, however, dismally failed. In 1904 Mr. Maclean, who had held the office of President since the start, resigned. Just prior to this the club had been split into two hostile camps on a question of policy, and feeling ran high. On Mr. S. H. Wratten being elected to the post, harmony was immediately restored, and the few backstairs mischief-makers (ever a peril to any society) became aware there was nothing doing in their particular line and reformed or cleared off. Since then all has been well.

Contrasting the past with the present, it is not possible to report the proceedings of a photographic society for over seventeen years without becoming aware that real copy becomes scarcer and scarcer as time progresses. In the past, even long after the advent of the dry-plate, new lenses, new processes, the magical properties of the latest developer as vouched for by consulting experts, among other things, gave members something to discuss. Also there were such dear old bones of contention as the H. and D. myth; purity of manipulation *versus* faking: ordinary *versus* ortho plates; now reduced to a stalemate condition. In the present year of grace and bombs, procedures and the principles underlying them are more or less grooved and settled, thanks to the scientific type, which at birth might profitably have shared the fate of superfluous kittens from the somewhat selfish points of view of a photographic society. On the other hand, art, and art talk and criticism, still do brisk business, and as regards the two latter may be considered eternal in the sense of being unchanging. Then there is the obvious fact that a society can only live by the introduction of new members, and their interest and enthusiasm all help to keep things going and are to a great degree infectious. Novelties are rare, but occasionally crop up, and, what with ever-necessary stock demonstrations, lantern lectures, print displays and competitions, and the occasional importation of outside technical and scientific subjects, no club endowed with the right spirit need go under.

The evening terminated by the victims of these reports heaping coals of fire on the reporter's head by a presentation of a fountain pen set in gold, and a silver tobacco-box. The kindly things said by the President, Mr. A. E. Catharine, and his predecessor, Mr. J. Keane, modesty prevents recording, but they, and the handsome gift, were keenly appreciated.

FORTHCOMING EXHIBITIONS.

April 18 to May.—Hampshire House, Hammersmith, Photographic Society. Entries close March 19. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12

Commercial & Legal Intelligence.

Operator's Claim.—In the Bow County Court, before his Honour Judge Graham, K.C., Charles Edward Wyrall, of The Nutshells, Glensford, photographer, sued Messrs. W. E. Wright and Sons, of 65, Woodgrange Road, Forest Gate, photographers, to recover £15. Mr. Broxholme appeared as counsel for the plaintiff and Mr. W. E. Hunt, barrister, for the defendants. It appeared that the plaintiff entered into an agreement with Mr. W. B. Wright to enter the defendants' employ, dated December 29, 1916, to commence on January 4, 1917. In the agreement it was laid down that he was to receive £15 from the defendants on leaving their service. He was sixty-seven years of age, and an experienced photographer, having been in the trade all his life. He had medals for his work. The defendants had a daylight studio for children. He denied that he had at any time been uncivil or ungentlemanly to any of the customers, thus causing complaints. It was true every customer had not been satisfied, but that was bound to happen, as the weather was not always satisfactory for photographing. The first complaint was in January, when a lady came in with a baby to photograph. The light had gone, the baby wriggled, and altogether it was impossible to do justice to a photograph. The lady was cross and irritable, went downstairs and complained of his incivility, but he denied it. The defence was that the contract had to be determined owing to the complaints as to his incivility and the way generally he treated the customers.—Judge Graham finally decided in favour of the plaintiff for the £15 claimed and costs.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE COVERING POWER OF LENSES.

To the Editors.

Gentlemen,—The writer who judiciously disguises (to most readers) his identity by the adoption of the most inappropriate signature of "Office Boy" appears to have been singularly unfortunate in his purchase of a lens with such "violent marginal aberration" as I have never met with except in an instrument in which the glasses had been misplaced; but even in an out of the way case covering power may be useful beyond the area of fine definition. This frequently happens in architectural subjects, when the lens front has to be much raised, and it is required to have a sky lighted to the corners. On many occasions, when photographing high buildings on 12 by 10 plates, want of retiring space has necessitated my using a lens of about 7 in. focus (Ross-Zeiss wide angle), and, in one instance, of a lens of less perfect construction, but of still wider angle, and of about 5 in. focal length. Therefore, to say that what "Office Boy" calls stray light "serves no purpose except to lead one astray" is untrue, and his statement that "the circle of illumination per se is of no use to the photographer" is contrary to the fact. Moreover, I do not know of any lens now manufactured with aberrations so intense that useful definition may not be obtained with it, very nearly, if not quite, up to the area of illumination.

The writer of the letter says that "the term covering power has a definite meaning relating to useful definition over a certain area, with a common-sense allowance for varying types of lenses, and also for variations in their price." At that rate, after we have examined and ascertained the capabilities of a lens, we are unable to state its covering power until we know its price! Can absurdity go further? It may appear to be a waste of time to refute the fallacies of a writer who adopts anonymity, but as attention is directed to these strictures in an editorial column, I have thought it desirable to notice them.—Yours faithfully,

W. E. Debenham.

March 23.

LENS NAMES.

To the Editors.

Gentlemen,—By misfortune we have not had an opportunity previously to reply to an article in your issue of October 20 last year, in which the writer comments in a most interesting way on the names of photographic lenses, and incidentally says that "the study of nomenclature seems to reveal human nature at the lowest depth of banality. He refers to our own trade names of "Serrac," "Adon," "Carfac," which he describes as "most intriguing," and expresses the opinion that there may be some readers who may furnish a clue, or exercise their ingenuity on them.

It is very difficult to strike the exact point at which a new trade-name, while fanciful, so that it is permitted to be registered, may yet start ideas apposite to the inventor. In choosing the name of "Adon" for our telephoto lens, the originator, the late T. R. Dallmeyer (then president of the Royal Photographic Society and well acquainted with fancy names in the trade), was guided (we conjecture) by a view that his new lens would be added on to other lenses in such a manner that nearly every lens would be adapted to telephotographic purposes by merely adding this lens. In practice it is not so much used in addition to other lenses, but is more often employed by itself for aeroplane and other distant photography. Nevertheless, we imagine that the plan of "adding on" may have influenced him in forming a new word, though in the ultimate spelling of the name he was willing to make a pun, and allow it to be confounded with an Eastern title meaning Lord, from which come the Greek Adonis and many names (as Adonijah) in Hebrew and other languages.

"Carfac," which was designed for us by Lieut. C. F. Lan-Davis, is fairly clear to students of old French. In Oxford and in Horsham there are well-known streets or points called "Carfax." This English word is of French origin, compounded of *quatre* (four) and *face* (French and English *face*, Latin *facies*). It refers to the place where four roads cross, and may be compared with the modern French *carrefour*. Our lens called "Carfac" is a compound lens made of four simple lenses, and its inventor, Lieut. C. F. Lan-Davis, was perhaps influenced in naming it by the form which the French for four had assumed in *Carfax*, *carré*, etc., and probably took the ending "ac" because he intended to have a whole series of lenses designated by words ending in "ac."

Hence also the origin of "Serrac," a later design of the same able optician, before he had entered the Royal Naval Air Service, in which he became missing.

Possibly this contribution to the history of trade-names will be interesting to students of optics and of trade, and we therefore accept the kind invitation in the article to give a clue, and at the same time to defend ourselves and our predecessors against being either "banal" or "most intriguing."—Yours respectfully,

J. H. Dallmeyer, Ltd.

Church End Works, Willesden, N.W.10, March 18.

* * *

X-Ray Work.—The "Sunic Record" for April, obtainable free from Messrs. Watson and Sons, 196, Great Portland Street, London, W., contains a contribution from M. H. Pilon, of Paris, on the use and care of valve-tubes.

Death of Mr. W. P. Marsh.—We much regret to record the death, on March 18 last at the age of sixty-seven, of Mr. W. P. Marsh, who for many years past had carried on the business of a photographer in Chichester. For many years previous to taking up his residence at Chichester he was established in Bognor, where he took an active part in the public life of the town as a member of the Urban Council.

The Late Sir Benjamin Stone's Photographs.—"Diarist," of the *Westminster Gazette*, writes:—"I hear that the famous collection of photographs taken by the late Sir Benjamin Stone has recently been insured for no less a sum than £10,000. This sum, I am told, is £2,000 more than that spent on insuring the whole of the remainder of the contents of Sir Benjamin's house. One of these days, after the war, we may see these pictures of national life and customs housed in a museum. In the meantime the precaution taken by Sir Benjamin's executors indicates the great value that is set upon the collection as a historic record."

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

M. B.—Under the present, 1911, Act there is now no cost in creating legal copyright, nor is it necessary to register prints as it was under the old Act. You have, in fact, to do nothing whatever. The mere fact that you make the photograph on your own, without anybody else paying you to do it, secures the copyright to yourself. We suggest that, as you seem to be unacquainted with the many new provisions of the 1911 Act, you will find it to your advantage to have the manual, "Photographic Copyright," issued by our publishers, price 1s. 1d., post free.

Anastigmat Lens.—I am offered a lens with inscription No. 5,928 Ross-Zeiss Anastigmat 1 : 8, *f*/110 mm. Can you tell me when this was issued, and what would be a fair price for it? It is in a focussing mount, and the diaphragm is actuated by what would, if it were deeper, be the lens hood.—Geo. Robinson.

The lens was issued by Zeiss in 1893, and the Ross-Zeiss about 1895. The price of the 4¼-in. focus (110 mm.) was £4 5s. in ordinary mount. As there is still a good demand for this lens, a fair price to a direct buyer would be about £2 10s.

J. W.—For photographic machinery, etc., *Commercial Photography*, price 1s. 1d., post free, from our publishers. A book which is now out of print, but possibly could be obtained from a second-hand bookseller, such as Messrs. W. and G. Foyle, 121, Charing Cross Road, is "Ferric and Heliographic Processes," dealing with blue-printing. It is, however, a very simple matter if you do not have to prepare the paper. Paper for blue-printing is now mostly bought ready sensitised from firms such as Marion and Co., Soho Square, or J. Halden and Co., Ltd., 8, Albert Square, Manchester.

A. T. T.—So far as we can tell from the negative, which arrived badly smashed, the yellowness is a fixing stain. We think it is this, because the rebate and the high-light portions are free from it, whereas it is confined almost to the shadows. If it is a fixing stain there is no means of removing it satisfactorily. On the chance of it being a developer stain, due to forcing the shadow portions of the plate, we should try the hypochlorite clearer made by shaking up 1 oz. of bleaching powder and 1½ ozs. of washing soda in about half a pint of water, pouring off from the deposit, and using the solution on the plates. But you need to be careful, as this clearer affects not only the image, but also the gelatine, if allowed to act too long.

Drying Postcards.—1. I want a good system of drying postcards, flat if possible. Am having hot water pipes in the studio, and thought I might build a small cupboard over them in one part, having shelves of muslin on a slant. I want to dry up to 300 or 400. 2. Can you recommend any books which would be useful in starting a studio.—D. D.

1. The method you suggest is a very common one for drying postcards, and should be quite effective for three or four hundred, providing you can fit an electric fan or ventilating gas burner in the upper part of the cupboard so as to draw a current of air constantly up through it, and so utilise better the warming action of the hot-water pipes upon this air. Without means for ensuring a passage of air up through the cupboard the drying effect will be very poor. 2. Unfortunately there is a shocking lack of books on studio portraiture; the only one which we can recommend to you, and that of some years' date, is "Lighting in Photographic Studios," by P. C. Duchochois, published by Hampton and Sons, Cursitor Street, London, E.C., price 1s. 2d.

Persulphate Reducer.—I have been using the persulphate formulæ for reducing high lights (faces in groups caused by under-exposure), but with rather unsatisfactory results. The fixed and thoroughly washed negative is immersed in the following:—Ammonia persulphate, 1 part; water, 20 parts. When sufficiently reduced, the negative is soaked for five to ten minutes in soda sulphite, 1 part; water, 10 parts. 1. Apparently the sulphite bath does not effectually stop the action of the persulphate, with the result that, after further prolonged washing, the negatives are found to be thinner than desired, and in some cases have to be intensified (with some difficulty) to become strong enough. 2. In the persulphate bath, at times, dark blots have appeared. Possibly this may be avoided by continually keeping the reducing liquid on the move, but doubt the cure.—F. G.

1. It is an inevitable feature of the persulphate reducer that its action is most rapid near the end of the process. You can mitigate this to some extent by using a weaker solution than you do. We should say 1 part of the persulphate in 40 parts of water, and you might add a little soda carbonate to the sulphite bath, which will make it a somewhat more effective stop bath. But the crux of the matter lies in removing the negative from the persulphate bath quite a little in advance of the stage at which it appears to have acted sufficiently. Personally, we find that potass persulphate is a more manageable reducer, using a bath made by mixing equal parts of water and of a saturated solution of the salt. 2. It is unusual for black deposits to form in the reducer, and we are unable to prescribe a preventive. Possibly a drop or so of sulphuric acid to the persulphate bath would do something towards preventing these dark coloured deposits.

◆

Season-Ticket Photographs.—Contrary to a statement quoted last week from the daily papers, in a prosecution by the Great Western Railway Company at Bath, the solicitor to the company made a statement to the effect that the Great Western were now considering a proposal that holders' photographs should be pasted on season tickets.

The British Journal of Photography.

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The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

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DEPOSIT SYSTEM.—When selling goods to strangers, or purchasing, all risk is avoided by employing our deposit system. Cost is trifling. The purchase-money must be deposited with the publishers, Henry Greenwood & Co., Ltd., 24, Wellington Street, W.C. 2, and all Cheques, Money Orders, &c., made payable to them. Acknowledgment is sent to both parties and deposit is held until receipt of advice that goods have been received and found satisfactory, in which case the amount deposited is forwarded to the seller, less a commission of 2½ per cent. (minimum, one shilling; maximum two shillings and sixpence). If goods are not approved the publishers wait original owner's acknowledgment of their safe return before refunding the deposit. In this case the minimum commission only (one shilling) is deducted. All disputes or questions arising from such causes as damage of goods in transit, &c., must be settled between the contracting parties. The deposit is held by Messrs. Greenwood pending settlement. Messrs. Greenwood do not undertake to express any opinion on the condition or value of goods, nor must the goods be sent to them.

⁂ To prevent delay communications relating to Advertisements and general business affairs should be addressed to the publishers. All advertisements are received subject to their approval or revision, and the right is reserved to refuse any advertisement without giving a reason for so doing. The publishers are not responsible for clerical or printers' errors, but every care is taken to prevent mistakes.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 3022. Vol. LXV. FRIDAY, APRIL 5, 1918. Price Twopence.

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SUMMARY.

In an article on window-dressing, Mr. M. Levy has a word to say in favour of a special enlargement as a feature of attraction. He also describes a method of passe-partout binding of smaller specimens, as used for their better display, and a system of double printing which lends itself to many variations likely to draw the attention of the passer-by. (P. 159.)

The hardness or softness of the wash-water as a factor in the blistering of prints is one which is connected with other causes, such as the existence of incipient blisters in the paper itself or the production of such between the emulsion film and the paper by improper usage. Consideration is given to these points in a leading article on page 158.

The extraordinary tenacity of the negative image on glass from which the gelatine film has been removed is the subject of a note by Mr. C. W. Waggoner, who records the persistence of the image (but in positive form) on silvering the cleaned glass even after the latter has been brought almost to its melting point. (P. 161.)

Mr. Waggoner's note confirms the difficulty which dry-plate makers experience in avoiding recurrence of the earlier images when recoating cleaned negative glass. (P. 158.)

A formula for the use of permanganate as a hypo destroyer for roll film is given by a worker in India, who commends it for its rapidity of dealing with film in hot climates. (P. 158.)

A timely contribution to photographic literature is an issue of the "Photo-Miniature," dealing with the newest photographic developers. (P. 162.)

A hint on the avoidance of air-bells in tank development is contained in a letter from a correspondent. (P. 163.)

Photography is among the technical employments for which women are now being recruited for the Royal Air Force. (P. 162.)

At the Shoreditch Tribunal last week a decision was come to regarding the formation of a committee to supervise the carrying on of the businesses of several photographers for whom further exemption from military service was not granted. (P. 163.)

An effective lens-hood, which can be very easily and quickly made, is the subject of a paragraph in "Assistants' Notes." (P. 161.)

Another note in the same section describes a means for loosening lens rims. (P. 162.)

"Colour Photography" Supplement.

The use which may be made of the Autochrome plate by photo-lithographers is the subject of a paper by Mr. A. C. Austin. (P. 13.)

An interesting item in the past literature of colour photography is resuscitated by a correspondent in the shape of the suggestion for the making of three-colour prints by Henry Collen in 1865. (P. 16.)

The current instalment of the "Decennia Practica" of colour photography contains formulæ for filters for flashlight exposures on Autochrome plates, together with details of copying Autochromes and of the making of three-colour carbon prints from the Lumière transparencies. (P. 14.)

EX CATHEDRA.

Portraits of Men. There are few if any photographers in these islands who boldly announce that they specialise in masculine portraiture, after the fashion of Pirie Macdonald. Certain firms seem to have a leaning this way, although perhaps they are doubtful as to the wisdom of cutting adrift from the ladies. To such, a remark made by a male sitter may give a useful hint. The gentleman in question called upon a photographer who rather specialises in feminine portraits, and asked if it were allowable for him to be depicted in the very soft style used for the ladies. He said that he had been looking at all the men's portraits in the showcases, but they were all too sharp and too hard in definition and lighting to suit his taste, so that he went to a women's photographer, not to be made beautiful, but to get something that was more a general impression of his features than a clear-cut diagram of them. There is no doubt that the taste of the public—or, let us say, of the ordinary business man—is becoming more cultured, and that the "soft focus" pictures of a few years ago would meet with a very different reception to-day. A few days ago we were showing a series of photographs of the same sitter, taken with lenses giving various degrees of softness, to a non-artistic group of his friends, and, to our surprise, nearly all selected one with a considerable amount of diffusion as the best portrait.

* * *

Camera Vignetting. The practice of vignetting during the exposure of the negative by means of a serrated card placed between the lens and the sitter has had rather a mixed reception by photographers. Some high-class workers approve of it, while others consider it as a meretricious expedient, unworthy of the notice of an artist. As a matter of fact, camera vignetting affords a ready and very effective way of producing the so-called "mezzotint" or grey vignettes, which were at one time popular, but which it is almost impossible to produce in the ordinary way upon bromide or gaslight papers. It is not, however, to this class of vignette that we wish to draw particular attention, but to the facility in producing soft vignettes of the ordinary kind from negatives of which the lower part is already vignetted. Every practical printer knows the difficulty of preventing the vignette from "creeping" too far when black coats or blouses have to be dealt with; and in such cases the camera vignetter is a boon. One thing to be guarded against is making the lower part of the picture lighter than the general tone of the background. It is a good plan to keep a selection of cards of various tints, so that too much reliance does not have to be placed upon the angle at which they are fixed. The actual fitting for holding the card may be very simple or quite elaborate; we have found that the most successful workers prefer a pattern which permits of all adjustments being made while watching the effect upon the ground glass.

* * *

Images on Cleaned Glass. The note by Mr. C. W. Waggoner, printed on another page, has a very direct reference to the problems of the hour in the manufacture of dry-plates. Although makers have endeavoured by all the means in their power to offset the shortage of glass by utilising waste negatives from which the emulsion film has been cleaned off, difficulties have been experienced in getting rid completely of the images which formed the subjects of the old negatives. It might be thought that such drastic cleansing as is carried out with solutions of acid bichromate or caustic soda, followed by the coating of the clean plates with a substratum, would suffice to safeguard the freshly-coated plates from any recurrence of the images which they received in their previous state of sensitiveness. Yet we believe there is at present no absolutely certain means of destroying these images completely, and that view receives very strong confirmation from Mr. Waggoner's experiments in silvering glass which had previously been the support of a dry-plate negative image. It would seem from his experience that the image is actually formed in the glass itself, and is not destroyed even by application of heat to a degree at which the glass begins to soften. In the light of such stability it is scarcely to be wondered at that dry-plate manufacturers, who must deal on a large scale with glass which they coat, should be unable to remove these first images with invariable certainty. On the contrary, there would seem to be good reason for satisfaction that the images appear on recoated glass plates as infrequently as they do.

* * *

Permanganate Hypo-Eliminator. Those who like to have a definite formula may note the prescription in a recent issue of the *Journal of the Photographic Society of India* for the bath of permanganate for the chemical destruction of hypo. Captain P. J. Kerr, who uses it for roll-film, dissolves 20 grains of potassium permanganate in 1 gallon of water. About 8 ozs. of this solution are used for a spool of film, which is moved in the bath until the latter turns brown. A fresh lot of bath is then at once used and the process continued through, so Captain Kerr says, ten changes. It is mentioned that the last two or three baths should be diluted to a pale pink, which, as soon as the film is free from hypo, will not change colour. Also it is advised that the film should be rinsed in clean water after every four changes. Used according to this plan, it is found that the method is free from any liability to stain the film. It may be thought by some that a succession of ten changes of water, used in the same way, would serve to wash a film from hypo. Probably it would, but not with the same speed as a succession of permanganate baths. On the ground of its rapidity, an item of importance in a hot country like India, it is, no doubt, superior to any method of washing in plain water, and it is interesting to note the experience of Captain Kerr that it is quite satisfactory in use.

* * *

Before Copying. Much labour in finishing prints from "copy" negatives may be saved if the prints receive a little preliminary treatment before making the exposure. Old snapshots and other unmounted prints are often brought to the photographer in a dog's-eared, crumpled state, which absolutely precludes any chance of getting a good reproduction. If the owner has no objection, the first step is to dry-mount upon a hard, smooth surfaced card, using as low a temperature as possible and giving a heavy pressure. This will remove nearly all creases, and leave the surface in fair condition. In very bad cases the mounted print may be left screwed up in a cool press all night. Wet mounting is not desirable, for if the surface is at all injured dirt will be washed into the cracks. Having got the print flat, a little cleaning of the surface may be done. For gelatine papers a pellet of cotton wool moistened with methylated spirit will usually remove finger marks, and also the tarry deposit often found when a print has been standing for years upon a mantel-shelf. The print is now ready for spotting, which should be carefully done. Body colour may be used if necessary, the print being worked upon (although to a lesser extent), as is usual for process reproduction. The working up can, of course, be removed before the print is returned to the owner. This method saves an enormous amount of work upon both negative and prints, especially if a number of copies is required.

FACTORS IN THE BLISTERING OF PRINTS.

As the letters from several correspondents recently have shown, the hardness or softness of the wash-water is a very material factor in the blistering of prints, particularly in the case of those which are passed through the customary sepia toning process of bleaching and darkening or toning by a sulphide bath. Nevertheless, it requires to be borne in mind that, after all, this action of the wash-water is a secondary one. The wash-water plays a part in a series of physical changes which, according to circumstances, may or may not give rise to blisters; or, to put it another way, there are predisposing causes to blisters the effect of which is intensified by a wash-water which is soft. It may, therefore, be of service to examine these somewhat more closely, in order that the causes which in the first instance provide the opportunity for blisters may be recognised and, in a measure, avoided.

In each case there must be what we may call an incipient blister, or a minute defect or cavity capable of development into a blister. Such defects may be due to various causes. Rough handling, or friction between prints in the various baths, is very liable to put a local strain on the soft wet gelatine that causes it to lose perfect adhesion with the paper support. But, also, it is not easy in any case to ensure that the gelatine adheres perfectly to the paper in every part, especially when the paper is rough-surfaced. In fact, many blisters are due primarily to the facts that paper is the support, and that it has a peculiar structure. Contrary to general ideas, blisters are very often in the paper itself, and not between the gelatine and the paper at all. This can easily be proved by cutting through the blisters and examining their inner surfaces. The cause is not difficult to understand. Paper is actually a kind of felt of interlaced fibres, but it differs from ordinary felt in that its thickness is very small indeed compared with the length of the fibres, while the fibres are brought together in somewhat different fashion. In the paper-making machine the fibres settle down in layers, and while each layer is well felted together there is not nearly so much entanglement of the fibres between the separate layers. Thus, the fibres at the back of a sheet of paper are not very intimately entangled with those on the front surface, and the consequence is that even thin paper, such as that on which the "B. J." is printed, can often be split into two thinner sheets. Such splitting often occurs when a piece of paper is torn apart, while photographers with any experience of the unmounting of prints must be familiar with it.

The weakest part of a sheet of paper is therefore in the middle of its thickness, or between the back and front surfaces, and at any point where there is no direct fibrous bond between front and back an incipient blister may exist, or be produced by slightly rough usage. Any cavity, however minute, may develop into a visible blister if favourable conditions exist, and such conditions may very easily exist at some stage of the photographic process. The conditions are simple enough to understand, and when understood they are usually quite easy to avoid; therefore it is very advisable to know them. Taking the case of any minute cavity, either in the paper or between the paper and the gelatine, if that cavity is first filled with a strong solution of almost any kind, and while thus filled the whole print is immersed in pure water, then that water immediately rushes into the cavity to dilute the solution contained therein, and at once expands that minute cavity into a large one. This phenomenon, called "osmosis" by chemists, is perhaps the almost universal cause of the swelling of blisters. The truth of the explanation can readily be demonstrated by putting a blistered print into a very strong solution, when the water will immediately rush out of the blisters into the stronger solution outside, and allow the blisters to subside. The essential thing, therefore, is always to avoid following a very strong solution by plain water, for the greater the difference between the two fluids, the greater is the chance of blisters.

If the strong solution happens to be hypo then even hard tap water may produce blisters, while pure distilled or soft water will cause blisters when tap water will not. The effect, however, does not depend solely on the difference between the two fluids, it depends to some extent on the nature of the solutions. Some salts will diffuse out of the cavity very rapidly, almost as much so as the water rushes in, then the danger is lessened. On the other hand, some will only diffuse out slowly, strong hypo, for example, and then the risk is much greater. Further than this, the condition of the gelatine through which the diffusion has to take place affects this question materially. For example, no salts will diffuse through a membrane that is saturated with a ferrocyanide compound, and the partial existence of such a compound may hinder the diffusion very materially. Possibly, we do not know for certain, the use of the ferricyanide and bromide bleacher may have some slight influence on the formation of the blisters that form in sulphide toning. Another thing that must obviously affect the result is the relative softness or toughness of the gelatine. If this has been especially softened by previous baths it is clear it can offer little or no resistance to the pressure of the inrushing water, hence the formation of blisters must be favoured. Such a softening solution is the sulphide bath used for toning; therefore there are two good reasons why this bath should never be stronger than necessary.

Blisters that are formed between gelatine and paper are usually fatal to the print. They can generally be identified by their softness and flabbiness, and their positions will usually be clearly shown on the dried print by uneven shrinkage of the gelatine. On the other hand, blisters in the paper may subside without leaving a trace. Such blisters usually subside evenly in a strong hypo bath, whereas the others will mostly collapse and crinkle up. If a multitude of blisters appear the best thing to do is to throw away the print, for one can hardly expect all to disappear; but if there are only one or two the case is not necessarily hopeless. The remedy is to apply a strong bath that will shrink the blister, and then follow by more dilute baths to avoid re-swelling. After this, tap water can be used with greater safety. If the blisters occur in washing after fixing, we may just as well use hypo as not for the letting-down baths; but if we wish to avoid hypo then ordinary salt is a good substitute. Alum, formaline, or spirit will not, according to our experience, help much at this stage, though spirit, cautiously applied, may be used to shrink the blister just before the drying stage. It is, however, liable to leave a visible trace. Alum and formaline can only play their parts effectively if applied before the blisters appear, and cannot do much to remedy existing blisters. No pressure should be applied to a blister with the view of squeezing out the water. Pricking is sometimes advocated, and we have used it with success, employing a very fine needle; but it does not always succeed. A safer method, we think, is the gentle application of a little alcohol with a soft brush; but the safest perhaps is to put the print face-up on blotting paper and let it dry as it will. Paper blisters that have disappeared during the drying can sometimes be actually cured in the mounting process, for a soft starch or paste mountant well rubbed into the paper will often effectually seal up the cavity left inside the paper.

THE WINDOW DISPLAY OF SPECIMENS.

There is not the slightest doubt that in a sense a commercial traveller is the "window" of the firm he represents. A photographer can dispense with the services of a representative, but the fact remains that he simply must have a window. It matters not whether the studio is situated on the ground floor, basement, or top flat, he is obliged to make some sort of show in order to inform the public that he is a photographer. The modern and up-to-date portraitist, however, goes a step further and endeavours to convince the public that his is the best studio in the district. It is not sufficient for him that the studio enjoys a good reputation, that it is well advertised, or that it is paying really well. Instinct warns him that he must continually exert himself if he wishes to maintain this happy state of affairs. We all know that such factors as promptitude in the execution of orders, minute personal supervision in the workrooms, and courtesy to clients are extremely helpful in securing and retaining patronage. The farseeing business photographer knows all this, but is not satisfied, he desires to secure new customers. This is where he is faced with difficulties requiring a judicious mixture of artistic ability and inventive genius.

We photographers have to thank electricity, not only for placing us on a business level with other shopkeepers, but also for the fact that the introduction of the half-watt system of lighting has given us at hand a means of securing the best results at any time of day or night. The aphorism remains that patrons do not keenly appreciate the questionable delights of being elevated to a high altitude by means of a lift. In this respect we do not yet seem to be Americanised, even although the studio in question is situated less than fifty flats aloft. Prior to the advent of electric elevators, and mostly in large cities, prospective sitters were forced to climb a number of interminably long flights of stairs to reach the studio. It did not alleviate their feelings when ultimately they did reach the coveted goal, in a more or less perspiring and exhausted condition, to be told by the plausible operator that the light was fast failing, and that if they would be good enough to call again, if possible a little earlier in the day, he would be ever so much obliged, and guarantee a work of art, etc., "ad infinitum."

It is to be regretted that many such unfortunately placed studios are still in existence; how they can manage to exist can only be understood by those who run a "coupon" or "club" business. In the latter case they are often forced to employ a doorman or "tout" to entice people upstairs. The obvious expense of this expedient would almost pay the rent of a commodious shop in a main street. Nowadays, people can get photographed in the course of an ordinary shopping tour without the slightest inconvenience to themselves. Hence a photographer wishing to open a new business or branch contrives to lease a shop in a busy centre, with plenty of good window frontage, armed with the sublime knowledge that he can arrange the light to suit himself, and that he is quite independent of the assistance of his old elusive friend "King Sol."

The portraitist of former times had often to be content with a poor display, comprising just one or two cases at the door. Now, however, he is in the happy position of possessing windows that require periodical changing, and some acquaintance with the "fine art" of window-dressing. Notwithstanding this material advantage, few seem to derive the utmost benefit, either because they do not take the necessary trouble or do not know how to make a good display. The result is that many windows, although frequently changed, seem to contain similar specimens year in and year out.

It may be remarked in passing that the special preparation of prints for display purposes involves a good deal of work and may prove distinctly harassing to the busy printer and finishing staff, who may be already hard-pressed with overdue orders. This point, however, will be dealt with later. I would emphasise at this stage the absolute necessity of a change as soon as the requisite number of prints are prepared, but it is mere waste of time and materials to cram up a window with specimens such as one sees so often in busy centres. Such a wholesale display at once lowers the tone of the work. People who are idly or subconsciously attracted to the window go away unimpressed. Their eyes wander aimlessly for a short time about the window, but their minds concentrate on nothing in particular. They look upon the display as nothing out of the ordinary, and thus business is lost.

A Striking Show with a Minimum of Specimens.

Attraction must be the aim of the photographic window-dresser. It is easily attained by any person of average artistic ability, or indeed by anyone using a little common sense and forethought. In this connection I would urge the necessity of a central feature, say, a good enlargement, and "coûte que coûte," let it be no less than 30 by 20. This will assuredly prove to be a good investment. In these martial days, what better subject could be got than a V.C.? Make an effort to interview personally one who has lately been thus honoured. Explain to him exactly what you desire a sitting for. Allow him his out-of-pocket expenses plus a few copies to distribute to his friends, and "voila!" you have manœuvred an excellent coup. Failing a V.C., a D.C.M. or any other recognised hero will answer admirably. It is patent, of course, that the full name of the subject, with a short description of how the award was gained, will not only enhance the value of the "picture" in itself, but, what is equally important, will attract attention to the other specimens as well. A few of the latter should be tastefully arranged, each picture unique in itself, and sufficiently striking to differentiate it from its fellows. A row of photographic blockhouses should be strictly avoided. A neatly-written card inviting those interested to inspect a full range of specimens within the premises completes what should be a good "pulling" display.

As I have already said, perpetual worrying of the printer should not be countenanced. This problem, however, can be easily solved. A capable printer is always aware when he is dealing with a suitable negative for exhibition. This may happen to be a good effect in lighting, a new pose, or indeed anything which reveals something out of the ordinary. He should be advised to be on the "qui vive" for these, and, when printing the customer's order, to run off an extra print or two and put them aside for the purpose. It will be quite evident that this entails very little extra work, as the negative, if for sketch printing, is already vignetted and the exact exposure known. Only a fraction of time is therefore expended on the extra prints. These may be finished at the same time as the original order, or at some opportune moment later. In this way a number of good specimens may be accumulated, and it is then a simple matter indeed to make a selection when required without the usual bustle and worry. Another matter for deliberation here presents itself. I allude to that of framing, and great caution in this respect is most advisable. The vital point to consider is that it is *the print we are exhibiting, not the frame.*

Framing will make or mar a picture, and fancy framing of portraits is intolerable. For the large picture there is nothing more commendable than a substantial moulding known as three-inch bevel oak stained brown. This enlarges and enriches the appearance of the portrait. It is understood that the print will be toned sepia. If a warm sepia, then all the better, as the latter colour is akin to the khaki worn by the soldier portrayed. Apart from this consideration, a sepia-toned picture has been proved to be more permanent than one in black and white. This is no mean consideration when one is aware that the enlargement is forced to face the burning glare of the sun, often for hours and hours in the summer time.

The next matter that confronts us is, whether the smaller specimens should be framed or not? I say, yes—and no. This sounds contradictory. They ought to be framed, because prints, owing to atmospheric variations, will bend and twist, no matter how well they are mounted. At the same time, I would emphasise the fact that framing, more especially in the smaller sizes, greatly detracts from the artistic merit in a portrait study. Perhaps the best plan is to adopt the method of passe-partout framing, or binding, as the work should be properly termed. This method is useful for prints from cabinet size up to 15 by 12. For the smaller sizes, the paper binding showing in front of the glass should not exceed one-eighth of an inch, and the others pro rata up to one-quarter of an inch in breadth. Matt or pebbled black is most suitable for prints in neutral shades of black, whilst brown should be used exclusively for sepia-toned prints. Above all, it is as well to bear in mind that "contrasty" effects are inconsistent with artistic results. Many assistants are averse to passe-partout framing. They consider the job irksome and messy. To be sure, I have frequently observed some inelegant examples of this method, and yet any intelligent assistant *should* be able to frame quite a number in a short time.

The requisite materials are few in number and easily procured. A roll each of black and brown passe-partout binding paper should be purchased. These may be obtainable from any stationer dealing in artists' requirements. A most useful accessory for this work is a strip of plate-glass measuring about 16 inches in length and 2 inches in breadth. Any glazier will give you this for a few pence, as it can be cut from a piece of waste glass. The sharp edges should be smoothed off with an old file or the back of a sharpening stone. This is used as a paper weight for the cut lengths of binding strip, and prevents them from rolling. A No. 3 camel-hair brush will also be required.

The rolls of binding paper are actually gummed, and to all intents and purposes ready for use simply by damping the gummed side. I do not here wish to question their adhesiveness, but experience has taught me that an additional dilute coating of a strong adhesive substance at time of use is absolutely necessary when the larger sizes are to be dealt with. In fact, I adopt this expedient for all sizes for obvious reasons. For this purpose, half fill an ounce bottle with warm water, add about ten large drops of seccotine, and stir well. Workers are sometimes annoyed to see the binding strips rise soon after it dries. This is caused by *the original gum being dissolved and washed off* the strips during the process of wetting it, and naturally when dry peeling off its support. The modus operandi is as follows:—

First, see that the necessary cover glasses are scrupulously clean. Avoid using glass for this purpose that shows any flaws or scratches on the surface. Rejected negatives can be used up. These can easily be cleaned. The most satisfactory method is to place one in a dish containing a hot solution of carbonate of soda for a few minutes. With the edge of another waste negative, shave off the softened emulsion, and it can then be expeditiously cleaned ready for use. Any uncoated glass can be thoroughly cleaned by first rubbing over with a piece of chamois skin dipped in whitening, and finally polishing well with a dry fluffless cloth. To ensure that the prints are the exact size, first lay the cover glass on the print to be bound, and when in its proper position run a pencil mark round the glass, and then trim off the superfluous card or paper. Should the print be attached to a fairly stout mount or cardboard, no other support or backing need be used, but if the print is unmounted, or mounted on a thin or flimsy support, it will be necessary to cut a cardboard the same size as the glass. Any old mount or card, preferably without a platemark, will answer this purpose. In the latter case the print should be dry-mounted on to the backing card.

When several prints are to be bound at the same time, it will be found advisable to affix the strips to the glasses first. A sheet of glass is now placed on a clean piece of paper. A strip of binding paper is cut the same length as the glass and slipped, adhesive side upwards, half under the strip of plate-glass as in fig. 1. This, of course, acts as a weight to prevent the binding strip from bending or curling. Whilst in this position run the camel-hair brush, which has previously been dipped in the bottle of dilute Seccotine, along the exposed half of the adhesive strip. Now quickly and carefully lay the glass down on it so that a narrow, even edge of the required width is shown fixed on the under edge of the glass. Press the glass firmly for a few seconds, remove the strip of plate-glass, turn the sheet of glass upside down, and with a soft dry cloth firmly rub the adhesive paper into proper contact. This operation must be very smartly done, because as soon as the edge of the paper is wetted with the brush the former immediately begins to expand in a semi-circular fashion, as in fig. 2. And when this occurs, it is almost impossible to attempt to fix it on to the glass with an even edge. The opposite edge is similarly fixed on, and we are ready to deal with the top and bottom.

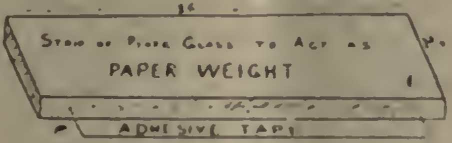


Fig 1.

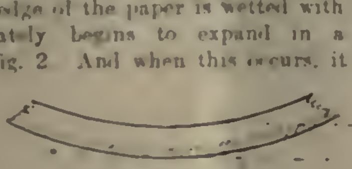


Fig. 2.

M. LEVY.

(To be continued.)

IMAGES ON SILVERED WASTE-NEGATIVE GLASS.

(Abstract of a paper presented at the Rochester Meeting of the American Physical Society.)

IN silvering some mirrors on glass negatives, from which the gelatine had been removed, it was discovered that in a number of cases positive images appeared on the glass. The images developed only when the side of the glass from which the film had been removed was silvered and they had the appearances of faint daguerreotypes.

It was first thought that these images were due to imperfect cleaning, but the silvered images reappear after treating the glass with conc. nitric acid, conc. sulphuric acid, Farmer's solution with potass. ferricyanide, 10 per cent. hydrofluoric acid, aqua regia, conc. caustic soda, sodium fluoride, and potassium dichromate cleaning solution. Some of the plates were heated in a furnace to the softening temperature of glass without destroying the phenomenon. The original gelatine film was removed by dipping the plates in lye and then subjecting them to steam under pressure. In examining a large number of plates after the film had been removed it was found that on a few, perhaps 5 per cent., a very faint image could be seen by reflected light and when the glass was silvered this image became very pronounced. This faint image could not be removed by the chemical cleaning mentioned above.

It appears that this phenomenon is due to the action of gelatine on the surface of the glass. That a film of gelatine will actually tear pieces of glass from the surface upon which it is placed and allowed to harden is well known to glass manufacturers, and is the process used in making the so-called "chipped glass" surfaces.

The images may be accounted for by the presence of the large amount of metallic silver in the shadows on the negative which may reduce this tearing action of the gelatine thus leaving a smoother surface for the silver mirror. The above reasoning would account for the fact that the image is always a positive image.

C. W. WAGGONER.

Assistants' Notes.

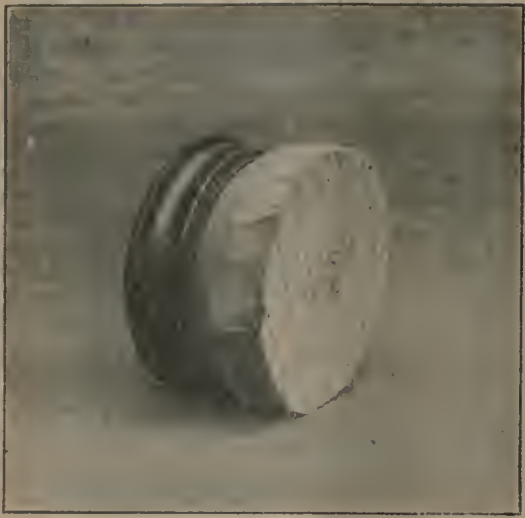
Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

An Easily-Made Lens Hood.

FOR avoiding flare or internal reflections caused by too much light on the front surface of the lens some form of hooding or shading is essential with many instruments, and we might almost say desirable with all. The modern lens has far too short a hood, and the consequence is that when subjects are being taken under difficult lighting conditions, even if flare does not manifest itself, the negatives will be quite perceptibly veiled, even if they do not closely resemble a bad case of light-fog. Many lens hoods have been put on the market or described at various times, all more or less elaborate or expensive, but I have found a simple one quite effective in every way. It may be made of almost any material, such as stiff black paper off disused roll film cartridges and a few pieces of very thin wood, but my own is made of American cloth, as being less easily torn. A strip of the cloth is taken long enough to go right round the lens mount and allowed to project as far beyond it as is possible without cutting off any of the field of view. We then want about half a dozen strips of wood about 1-16th of an inch thick and a quarter of an inch wide. These are fixed parallel with each other to the cloth with seccotine, and another piece of thinner cloth is stuck on the top of the strips, in order to give strength and hold all in position. The work may then be set aside in order for the adhesive to get thoroughly hard, and will then be ready for use. The "hood," when required, is simply slipped over the lens mount and held in place with an elastic band. Some lens hoods cut off top light only; but the fitment described above will cut off that from the bottom as well, for it often happens that with brilliant foregrounds such as snow or a sheet of water, this is as likely to cause flare or veil in the negatives as that coming direct from the sky. Far too few, even among expert workers, realise the value of the lens hood as an aid to securing brilliant negatives.—EXPERT.

A Simple and Reliable Method for Getting Lens Bezels Out.

It often happens that in portrait and other valuable lenses the rim or bezel which keeps the lenses in position gets fast and resists all ordinary efforts to remove it, making cleaning of the inner lenses impossible. Various methods have been recommended for the purpose, but the method described, if done properly, cannot fail, and cannot injure the lens or its mountings in any way. We require a piece of hard wood, ash, or beech (either is suitable), about one inch thick and sufficiently large to cut out a circle a little larger than the diameter of the lens. This should be taken to a wood or metal turner, or anyone possessing a lathe, and turned up in the lathe true on its edge a little larger than the rim that we wish to set at liberty. Then the edge of the wood carefully turned with a little sharp bevel, so that it will just fit tightly into the rim. Then, holding the wood in one hand and the lens in the other, and holding them firmly and tightly together, using an unscrewing motion, the rim will come out without any further difficulty. This method has been used with very great success on microscopic and other lens cells, which were fast and had resisted all other methods of removing them. Before replacing the rims they should be carefully oiled with just a little paraffin oil to prevent them getting fast again. The accompanying sketch will make the method of removal clear.—E. Hinge.



New Books.

"What Industry Owes to Chemical Science." By Richard B. Pilcher and Frank Butler-Jones. London: Constable. 3s. net.

Now that the war has brought into prominence the importance of the chemist in turning to the best advantage the materials scattered in the earth, and above it, throughout the world, it may be hoped that an incentive will be given to a better acquaintance with the benefits which the labours of the chemist confer upon the community. To that end this little volume very admirably contributes. It might very well have taken the title, "The Chemistry of Common Life," which was that of a volume by a German professor issued some twenty years ago. For, although it sets forth the benefits to industry, the industries in turn are those directly ministering to the daily needs of the community. The authors divide their work into a series of chapters showing the part which the chemist has played in the development of industries such as those of the manufacture of iron and steel, coal gas, leather, rubber, glass, tobacco, alkalies, and a score of other substances which come into the hands of everyone of us in their finished state, yet rarely prompt an inquiry as to the science which has organised and developed the processes by which they are made or refined. It is interesting to note in a glance through these readable pages the not infrequent instances of new industries owing their origin to the exigencies of warfare. It is when a blockade cuts off the customary sources of supply that the help of the chemist is fully utilised to provide a remedy. Many such enforced discoveries have proved the foundation of industries which, when the normal life of the country was resumed, proved of inestimable benefit to it. We may hope that there may be many examples of the same thing in store for Great Britain after the present war. Public interest in the application of science to industry can do much to forward such developments, and the public can have no more concise or popularly worded account of what has been accomplished in the past than Messrs. Pilcher and Butler-Jones's volume.

Modern Photographic Developers.—The latest issue, No. 167, of the "Photo-Miniature" will be welcomed as a timely contribution to a subject now very much in the minds of all photographers, namely, developers old and new. The author, Mr. Samuel Wein, provides a rapid and very readable review of the chemical constitution and relationships of the many substances, which are of practical service as photographic developers. Without going too deeply into the chemistry of the subject, he shows how the various developers are derivatives of one kind or another from the substance benzene, but the portions of his monograph which are of chief interest are those dealing with the substances which during the war have come upon the market as substitutes for developing agents manufactured in Germany. In this connection it is satisfactory to note that he awards great credit to two British makers, namely, Messrs. Johnson's, for their introduction of a developer identical with metol, and to the makers of Monomet, which he mentions as having proved for two years past an altogether satisfactory and efficient substitute for German metol. Apparently most of the newly introduced developers of American origin are substances more or less closely allied to paramidophenol. Mr. Wein gives tests for distinguishing the various bases of developers, and interpolates a number of useful hints on their practical employment. The issue altogether includes a mass of information on a subject which urgently calls for it at the present moment. Our little contemporary, we should add, is not now obtainable in this country, but can be obtained from the publishers, Messrs. Tennant and Ward, 103, Park Avenue, New York, by remittance of twelve penny stamps, or equivalent amount in international coupons.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Tuesday, April 9.

Royal Photographic Society. "Round About Grasmere." F. Humpherson. "Nicholas and Napoleon." B. C. Wickison.
Birmingham Photographic Society. "Rambles in East Warwickshire." Miss M. Silverton.
Manchester Amateur Photographic Society. "Choice of Plate, Exposure, and Development." J. D. Berwick.

Wednesday, April 10.

Croydon Camera Club. "The Raydex Natural Colour Photography on Paper." V. P. Davis (of Raydex, Ltd.).
Bristol Photographic Club. Annual General Meeting.
Photo-Micrographic Society. "The Domestic Fly, and what the Microscope Discloses." Dr. G. H. Rodman, F.R.P.S.
Ilford Photographic Society. "Elementary Photography of Animals and Birds." W. L. F. Wastell.

Thursday, April 11.

Leith Photographic Society. War Photography.
Stockport Photographic Society. "Photographic Originals and their Mechanical Reproduction." J. Hurst.
Hammersmith (Hampshire House) Photographic Society. "The Lure of Landscape." J. W. Lumb.

Women Photographers for the Royal Air Force.—Among the classes of helpers asked for in the Women's Royal Air Force are photographers. Full particulars regarding rates of pay and conditions of service and method of application for "immobile" members may be obtained from any Employment Exchange on or after to-day (Friday). Candidates for posts as officers should apply to the W.R.A.F. Inquiry Office, 9-13, Wellington-street, Strand, W.C., which will be open to-day, or to the Professional Women's Register, Ministry of Labour, Employment Department, 28, Broadway, Westminster.

News and Notes.

At the Willesden Tank Day 504 War Savings Certificates were taken by the local firm of Messrs. J. H. Dallmeyer, Ltd.

The Photo-Micrographic Society.—The next ordinary meeting will be held on Wednesday, April 10, at 7 p.m., at the King's College Bacteriological Laboratories, 62, Chandos Street, W.C., when Dr. G. H. Rodman, F.R.P.S., will give a lecture, entitled "The Domestic Fly and what the Microscope Discloses." Visitors are invited, and cards of invitation may be obtained from the hon. sec., Mr. J. G. Bradbury, 1, Hogarth Hill, Finchley Road, N.W.4.

Substitute for Cork Stoppers.—The shortage of cork in Germany (according to the "Chemist and Druggist") has made it necessary to find some other way of corking bottles. The following process is considered the best: A piece of parchment paper is put on the opening of the bottle, and a stopper of cellulose cotton-wool is pressed in; the bottle should then be turned up to wet the paper and make the whole stopper air-tight. The whole is then covered with another piece of parchment paper, tied up with string, and well sealed.

Photographers' One Man Businesses to be Run by Committee. A decision of considerable importance to photographers was arrived at by the Shoreditch Tribunal on Saturday, Mr. Harwood in the chair. There had been a number of applications by photographers recently and their medical category had been such that the Tribunal were reluctant to give exemption, but the fact that they were one man businesses decided them to do so. Captain Fisher, the National Service Representative, said the needs had become much greater, and he had been directed to obtain from the Tribunal their agreement to form a committee to run these one man businesses or a refusal.

Captain Weber said that so far as he could make out the idea it was intended that about three out of four of these men carrying on one man businesses should go, and the businesses should be carried on by the fourth under the supervision of a committee. Capt. Fisher, the National Service Representative, said that all the committee had to do was to look after the businesses and see that they were honestly dealt with. Mr. Wakeling: They haven't to run the businesses, only to see to the interests of the women left behind. Mr. Harwood: Perhaps a big liability might be incurred. What responsibility is there on the committee? Capt. Weber: None at all; only a moral one. I can see quite a lot of good things come out of it. It is only in the case of small one man businesses, so that no big liability would reasonably be incurred. One man could quite easily look for five or six shops, but at the present time exemptions are given to each of the men to save his business from being smashed up. The supervision is really only to do with monetary, and as the Government are pressing for it, I suppose we must do something in the matter. Capt. Fisher: They are pressing for an answer as to your intentions, as it is such an urgent, pressing matter. Capt. Weber said it wanted a man who was very tactful on the committee, as there would be a good deal of suspicion in his case. It would be nearly as bad as being on the Tribunal. Mr. Wakeling said he would have to be a jack of all trades, but would be a master of none. So far as he was concerned, he would not take on the job. It would never work in the cardboard box trade, as every man made a different kind of box, and nobody could carry on the other's business. Fancy the Mayor, Councillor Busby Bird, with his provision shops, running his own and somebody else's. He would be accused of smashing up the business if anything went wrong, and so would anybody else. Capt. Fisher: Oh no! Besides it is not necessary for the committee to be members of the Tribunal. Mr. Wakeling: If the Government want it done, let them pay for it. If it was a paid job they would do it themselves with an army of officials. It is a most brainless institution. Mr. Harwood said the first thing they had to do was to agree to the principle of the committee. If they agreed to appoint one to run these one man businesses, names could be submitted at the next meeting. If they found they could not handle the businesses properly, such cases could be brought before the Tribunal. On a show of hands it was decided to appoint a committee to run the businesses.

Correspondence.

** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

**** We do not undertake responsibility for the opinions expressed by our correspondents.*

TANK DEVELOPMENT.

To the Editors.

Gentlemen.—There is no question as to the usefulness of developing plate tanks. I consider the most simple form the best—that is, a plain upright tank, with separate rack for plates, and with loose lid to exclude light. I have a recollection that a suggestion for this style of tank first emanated from the Editors of this journal.

Although my experience of factorial time dish development has extended over many years, and though I had all confidence in the method, it seemed a hard matter to overcome a feeling of suspicion toward the tank method. However, "nothing venture, nothing win." A tank was purchased, and instructions followed, with the exception of formula for developer. Nothing has yet convinced me that there is a better one than pyro-soda, so that the regular formula was adapted to suit the tank simply by dilution. The one stock solution is always ready for tank or dish.

Tank work, of course, is a question of fixed temperature and fixed time, without examination. Now, my experience was not altogether satisfactory. Although dilution worked worked out accurately, which means that time is controlled exactly in proportion to amount of dilution, I found trouble from air-bells, and even irregular densities in a vertical form. These tanks have been generally advocated on the plea of cleanliness. The problem of air-bells had to be solved or the tank discarded.

Reason was brought to bear upon the cause. If this could be found, then the trouble could be averted; and upon referring to the dish it was found that a dry negative placed into a dish of water, at once taken out, and put in again, will develop air-bells *ad libitum*. The cause being found, the remedy would be to allow the negative to remain in the water for two minutes before exposing to air. After that time it will be found difficult to create air-bells. This is a theory I have proved in the tank.

To develop, use any standard formula—for instance, Royal Standard pyro-soda (with bromide), one part diluted with about three parts water, and adding one drop of 10 per cent. potass. bromide per ounce.

A rapid R.S. plate will require 8 minutes, extra rapid 12 minutes, and a lighting plate 24 minutes, lifting the rack and returning three or four times, say, after every three minutes, though for the larger period of development about every five minutes is sufficient. My fixing bath contains 1½ ozs. metabisulphite of potass. to 1½ lbs. of hypo.

There is a possibility of stained negatives owing to the longer time in developing fast plates: therefore it is better to make up two solutions of accelerator, one to contain slightly more sulphite, which will counteract the pyro stain.

The tank and rack, in my opinion, as sold to-day, are not quite ideal. If the tank must be of metal, it should be well enamelled or glazed, and quite impervious to the action of chemicals. The rack should contain nothing in the shape of screws or nails, and a wooden one is liable to warp. Some substance like vulcanite appears to be essential. The rack should, I think, be grooved the full length of plates, and the bottom part as open as possible. If a manufacturer could undertake something on these lines, and submit a model to a photographer as a test, it might then be possible to arrive at something which would reflect credit to themselves and prove a boon to the profession.—Yours faithfully,

Bedminster, Bristol, March 28. A. E. Stanley.

FORTHCOMING EXHIBITIONS.

April 18 to May.—Hampshire House, Hammersmith, Photographic Society. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

T. Bros.—Certainly, a sulphite which contains only 50 per cent. or so of real soda sulphite cryst. is a very inferior chemical. A first-quality sulphite for photographic work should rate at about 90 to 95 per cent. real soda sulphite cryst. We should not think of using such a sample as you sent for developers, but we think it might answer for acid fixing baths, using about twice the quantity recommended in formulæ.

W. W.—As you are now working with the light on the right of the sitter, and as the left side is usually preferred, we should recommend you to place the lamps on the other side of the studio. Necessarily you will need a great volume of light to get exposures of ¼ second at *f*/5.6, and we are inclined to recommend you to try the arc lamps first. These should have the actual arc about 7 ft. 6 in. from the floor and about 7 ft. from the background; have them to raise and lower for sitting figures and children. The two front lamps must clear the camera and be well shaded, so that no light enters the lens. Put a whitened tin reflector behind each lamp and a white calico diffuser in front.

E. G. B.—We advise you not to use hydrochloric acid instead of sulphuric acid, as it affects the hardening action, and the bath is somewhat inferior. You can use ordinary alum in place of chrome alum, although the latter is much more effective. Not possible to say how much more, but we should try half as much again, and if that does not give you all the hardening you want, then try double the quantity. Certainly there is no need to use the full quantities of the hardening components if you can do with less. In that case you should reduce them all in the same proportion to keep the hypo as it stands. The same applies to potass. metabisulphite; any quantity of this latter can be combined with hypo without ill effect.

Grubb Lens.—I have purchased a lens, and would like you to give me a little information of the same. I got it when buying a photographer's stock up. The lens is marked D, Grubb Patent 2094. It is an achromatic lens, 3½ ins. diameter, sliding mount, fixed focus, and no stops, but 1¼ in. aperture at focus. When mount is extended it measures 4½ ins. I would like to know what this lens was originally made for, also what is about its price and covering power?—E. B.

Lines from maker's catalogue:—Grubb's patent aplanatic lenses for views and groups. Designation, D; Diameter, 3½ ins.; focus, 18 ins.; field, 12 by 10 to 14 by 12; price, £5 16s. 6d. This maker's lenses have a very high reputation.

Colouring Photographs.—Can you give me instructions how to colour photographs, and as to what kind of paint to use, or is it a sort of dye colours especially prepared; and, if so, where I can get it? Also, do the prints require to be wet or dry at the time the colour is put on?—Art Mistress.

Oil-colours, water-colours and crayons are used in the colouring of photographs. A good guide to the technique of these methods as they are used in photography is provided by the manual, "The Art of Retouching Negatives and Finishing and Colouring Photographs," by Bruce and Braithwaite, supplied by our own publishers, 2s. 9d. post free. Dyes are used for tinting where permanence is not a consideration. The air-brush (aerograph) is largely used in colouring: see instruction in the manual above mentioned.

A. B. H.—Excepting for the length of exposure, there seems nothing to complain of in your arrangements, while the lighting appears to be quite satisfactory. The long exposures are due primarily to the small aperture of the lens, and it would be as easy to work at f/5.6 as at f/8 and halve the exposure. We think you are doing the ladies an injustice if you think they will not be able to focus sharply at a large aperture. It would, of course, always be possible to stop down for groups. Another point at which light may be lost is in the distance between the lamps and the sitter. This appears to be more in your case than is usual. Try the experiment of bringing the sitter nearer the light. The top lamps are to our mind rather too high for the shortest exposures, much of the 6,000 c.p. being wasted above the sitter's head. Try letting these down to 8 ft., but only if you bring the sitter nearer, then the angle of light will be the same. Finally, your lamps may not be running at their full voltage. Inquire at your local electricity station if the voltage is always constant. A drop of a few volts affects the visual strength of the light very little, but has a serious effect upon its actinic quality.

M. A. G.—For copying originals up to 12 by 10 size, we should say that a set of about six 32-candle Osram lamps, arranged three on one side of the copying board and three on the other, and each half set about 12 or 18 in. from the copy-board, would give you quite sufficiently intense illumination. We should say you would not find it a difficult matter to rig up the lamps for yourself in this way. In doing that, see that the lengths of the filaments are parallel with the copy-board (not at right angles to it); you then get a much better and more even illumination. The best form of camera is one of the old solid pattern, such as you can buy now for a pound or so from second-hand dealers. You do not say what size of negative you are taking, but if it is half-plate then we should choose a lens of the R.R. type of about 9 in. focus; then, if your camera has an extension of about 20 in., you can copy same size when necessary, but if you want to copy-enlarge, you will need a considerably greater extension, say 30 in. for an enlargement to twice diameter, 40 in. to three times, and so on. These are rough figures. The only book there is on copying is No. 156 of the "Photo-Miniature" series, for which you now require to write to the publishers, Messrs. Tennant and Ward, 103, Park Avenue, New York, U.S.A., sending 12 penny stamps or five 5-cent international coupons.

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Henry Greenwood & Co., Ltd., Proprietors and Publishers, 24, Wellington Street, London, W.C. 2.

IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as "returns" are no longer accepted by the publishers. This step has become necessary owing to the further restrictions imposed by the Government on the importation of paper and paper-making materials and of the consequent shortage of supplies. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

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SUMMARY.

The concluding portion of the article by Mr. M. Levy on the window display of specimens deals particularly with the framing of specimens in passe-partout manner and with the preparation of attractive window effects by border printing. (P. 167.)

Some further notes on the effects readily produced in making portraits of the glass-positive or Doretype description are quoted from the monthly circular of Messrs. Rajar, Ltd. (P. 174.)

A number of practical items in the fixation of large batches of postcards or prints are mentioned in a contribution to "Assistants' Notes." (P. 172.)

Schemes of interior decoration designed to imitate pleasant outdoor effects for the purpose of contributing to the cure of nervous disorders are of some interest in relation to the production of an agreeable effect in the portrait studio. (P. 165.)

Some of the factors which enter into efficient salesmanship of goods, such as photographic portraits, are the subject of an article on page 166.

In regard to the effect of soft water in causing blistering of [illegible] papers, one correspondent recommends the use of a salt solution after the sulphide bath, and cautions against the use of hypo-eliminators. Another reader recommends a developer such as amidol without the customary proportion of alkali. (P. 174.)

A recent demonstration at the Croydon Camera Club by Mr. W. H. [illegible] of the Platinotype Company of his firm's Platinotype paper dealt with a number of the practical items of manipulation which usefully supplement the official instructions for the handling of this material. (P. [illegible])

An American worker, Mr. Milton M. Bitter, sends us a detailed account of the modified system according to which he employs the Watkins Bee Meter in outdoor and indoor photography. (P. 170.)

The [illegible] of the bibliographical notes in the "B.J." of March 1 last is continued by a letter from a good American friend [illegible], Mr. Alfred S[illegible]. (P. 175.)

An effective means of sealing bottles without corks (by the aid of Plasticine) is the subject of a note on page 166.

A reminder of the value of the chromium intensifier in remedying weak bromide prints, both as regards depth and colour, will be found on page 166.

A handy means of keeping the pins used for bromide paper [illegible] where they can be readily found is the subject of a note on page 173.

Three ex-presidents of the Royal Photographic Society, Sir Henry Trueman Wood, Mr. Furley Lewis, and Mr. John H. Gear, have been elected to the honorary fellowship. (P. 173.)

EX CATHEDRA.

Curative Colours. There has long been a theory that the prevailing colour of a person's surroundings has a specific effect on his health or, at all events, on his temperament. Attempts have been made from time to time to put this idea into practice, but they have been sporadic and, in some instances, mixed up with charlatanism, and up to the present little has been definitely accomplished. It is, therefore, interesting to find that the theory is to be tested under proper conditions at Miss McCaul's Hospital for Officers in Welbeck Street, where a small ward intended for the reception of shell-shock cases has been decorated with such colours as will, it is anticipated, conduce to the restoration of normal nerve action. The colours chosen, as Messrs. Berger's "Mercury" tells us, are firmament blue for the ceiling and frieze, sunlight yellow for the walls, spring green for the woodwork, and "sunlight primrose" for the furniture and floors. The rugs upon the floor are primrose green, and the flower vases and tea service blue. The designer of this colour scheme, Mr. Kemp Prossor, aims at securing an open-air effect, removing all idea of restraint, and reproducing as nearly as possible the tints of a spring landscape. In one of his communications Mr. Prossor makes a remark which should be of interest to photographers, who, as is well known, are usually peaceful folk in spite of their long sojourn in ruby light, for he tells us that red is the colour of blood, inciting to rage and murder, while brown is the colour of death and decay. Perhaps, after all, he is right, and the sepia platinums or bromides have the depressing effect necessary after a few hours in the ruby light.

* * *

Reception Room Decoration. Since it is in the highest degree desirable that a prospective sitter should be brought into a calm yet cheerful mood, making both the giving of the order and the sitting for the portrait a pleasing operation, photographers who are planning redecoration would do well to go a little into the question of the psychological effect of colour upon the individual. We are told by experts that yellow is the most cheering and inspiriting of colours, that green is soothing and restful, and that blue is sedative; yet how seldom do we see any of these colours used upon our reception room walls. For the sake of the pictures we usually affect a grey or drab wall covering, and it cannot be said that as a rule cheerfulness is the prevailing note. With regard to the display of monochrome specimens, it may be of interest to recall the one-man exhibition of Dr. Emerson's work at the R.P.S. in the old premises in Russell Square. The colour-scheme chosen by the exhibitor was very much in accordance with that now advocated by the colour experts. The walls were covered with sunlight yellow and the frames were pale green enamel. Therefore there is a precedent for the display of black and white or sepia prints, if the photographer desires to keep them upon the walls; but there is happily a growing tendency to keep these classified in portfolios, and only to display them as needed.

* * *

Latent Images on Glass. The present necessity of using old negative glasses for the preparation of new dry plates has drawn attention to a matter that, in previous days, was only a curious phenomenon of no practical importance. Sometimes when an old negative glass is used for re-coating, on subsequent exposure and development the image of the original negative reappears along with that produced by the new exposure. The effect is rare, fortunately for the dry-plate maker, though Mr. C. W. Waggoner has found it to be comparatively common when the old glass is used for silvering purposes. This, however, is an extremely delicate test, far more so than that of re-coating with emulsion; and so the 5 per cent. of instances that he has quoted is, we believe, far in excess of the number of cases noted by the users of dry-plates. Mr. Waggoner's test shows that no chemical clearing methods will remove the latent glass image, while even annealing the glass has no effect. It is clear then that the image is not a superficial chemical deposit, nor yet an effect of strain in the glass. His suggestion that it is due to the gelatine tearing the glass surface we do not, however, quite follow, for while this would undoubtedly affect a mirror surface, it is difficult to see how it would affect an emulsion. The whole effect is very mysterious, and we do not know when it occurs; whether during exposure, development, drying, or after treatment. Probabilities seem to favour after-treatment as the cause. Intensification with mercury or lead, or possibly the use of formalin, but again the nature of the developer is another possible factor.

* * *

Cork Substitutes. It is interesting to note that our enemies are short of cork and have trouble in stopping up their bottles. They are reputed to have adopted a device of parchment paper and cotton wool, which does not look very satisfactory on paper, and we should have thought that the production of an artificial cork of some kind would have been accomplished in a rather more promising fashion by the painstaking German. We are not as yet quite so hard up for corks in this country, but no one knows what may happen, and so it may be useful to describe an eminently successful expedient that we have tried for the purpose of getting over a temporary shortage of first-class corks of exactly the right size. Some dozens of corks were required for a special purpose, and the requirement being that they should be perfectly airtight and watertight, while the glass was extremely thin and would not stand pressure, it was difficult to get what was wanted. As a temporary expedient balls of wax and of plasticine were tried, and the latter proved the best and were quite satisfactory, with one slight defect, which was that they sometimes went so far into the neck of the vessel that they had to be cut out with a knife. This trouble was speedily got over. Discs of millboard were cut, using suitable coins as templates; a few holes were then punched in each disc, and these holes afforded a key for the plasticine which was afterwards spread over the disc to a depth of about one-eighth of an inch. Pressing one of these prepared discs firmly over the top of the tube, flask, or bottle gave a perfect seal that was both airtight and watertight. When removed, the plasticine is simply smoothed over with the fingers, and then the stopper is ready for use again. It must be noted that plasticine must be used, not modelling clay, as the latter is affected by water. The plasticine has just the right consistency and the required amount of tackiness, while it is quite unaffected by water. It is affected by dilute mineral acids, but only to a very small extent by alkalies.

Weak Bromides. It sometimes happens that a bromide print or enlargement of otherwise good quality has to be rejected on account of its being a little too pale, and with the price of bromide paper on the up grade a hint as to how to save not only the cost of paper but the work of making another copy may not come amiss. The chromium intensifier is particularly suitable for dealing with such prints, its cost is infinitesimal, and the labour involved trifling. The print is bleached in a solution of bichromate of potash containing 50 grains in 10 ounces of water, to which is added 10 minims of pure hydrochloric acid; the quality used for cleaning platinum prints answers well. After bleaching, the print is washed until all yellowness disappears from the highlights. This operation is preferably done in weak daylight. When the stain has gone the image is re-developed with an ordinary amidol developer, which may have been previously used for other prints. Development proceeds rather more slowly than in the case of developing an ordinary exposure. Five minutes washing is all that is necessary after development; no fixing is, of course, necessary, as all the unaltered silver bromide has been already removed. We have also found Monckhoven's intensifier very useful with very weak prints, but as the bleaching is effected with mercury, there is much doubt as to the permanency in so thin a film.

THE ART OF SELLING.

THERE are many grades of photographic business, from the lordly mansion of Mayfair to the humble "while-you-wait" shop in Mile End, but in one respect they nearly all resemble one another; their owners do not recognise the value of skilled salesmanship. The fundamental error is in forgetting that the first duty and concern of the "receptionist" is to sell, and not to write letters, spot prints, and pack parcels. Photographic portraitists cater for much the same class of folk as do milliners, drapers, and jewellers, and the former would do well to study the methods of the latter when it comes to handling a prospective customer. If a lady goes into a West End milliner's, she is at once received with politeness, not unmixed with enthusiasm, and every effort is made, not only to satisfy her wants, but to supply only such articles as will bear subsequent criticism. Sometimes the customer will take a fancy to a "creation" that is quite unsuited to her face or figure, and then it is the task of the adroit saleswoman to lead her thoughts away from the unsuitable to the suitable style, knowing that every error in taste helps to deteriorate the reputation of the business. Compare this with the procedure of the average photographic reception room. The customer enters, looks round, and sees a young lady busily engaged at a desk or table. By the time she has reached her the receptionist has laid down her brush or pen, or, worse still, left off typing, and usually, civilly enough, gives attention to the customer's inquiries. More often than not the customer is led to a table covered with a heterogeneous heap of specimens, and kept standing until a selection is made, when the receptionist hastens back to what she considers her work after an annoying, but necessary interruption. Let us for a moment suppose that we transfer the milliner's assistant to the reception room, tell her the prices of the various styles and which it was most desirable to sell, what shall we see? The customer met half-way up the room, ushered into a comfortable seat in a good light, her dog snugly disposed of on a chair or cushion, as a preliminary to entering upon the business of showing specimens. Now comes the test of ability; some few people know exactly what they want, others think that they do, while the rest are usually in a hopelessly undecided state All must be dealt with so as to ensure the best possible return, and this cannot be done if there is any haunting remembrance of prints promised for the evening's post which are yet unfinished We are taking no hypothetical case; it is what is happening daily all over the country. Even in the most humble class of studio there is an opportunity to get from postcard sitters orders for enlargements and locket pictures if the assistant has the time and ability to do so, while in the higher grades the possibilities are practically unlimited. A word of caution to the aspiring salesman may be useful The push must be there, but it must be carefully concealed. There is nothing a purchaser resents so much as being dictated to, or having certain lines thrust upon her; the business must be done, not by driving the customer into the desired course, but by guiding them into it without their knowledge. From the nature of the business a photographic saleswoman can afford to be more intimate in conversation than a milliner or a jeweller, but such familiarity must never be allowed to exceed due limits. If suggestions as to style of picture are given they must not be accompanied by reasons, unless the reason is flattering to the sitter. For example, a sitter may be attracted by a beautiful profile specimen, while possessing no qualifications for expecting such a result in her own case naturally the receptionist will not enlarge on this fact, but dwell upon the expressiveness of the eyes in a full-face picture. A mistake that is often made is to judge the means and taste of the sitter from their apparel and style. One salesman told us of his chagrin on discovering that a shabby old man, from whom he had taken a five shilling order, was a wealthy earl, who would probably as willingly have paid as many pounds to get the best possible result. On the other hand, it is just as unwise to make the modest customer feel that his order is insignificant. Later on his circumstances may improve, and he is not likely to forget the place where he received courteous service. Every satisfied customer is a living advertisement. We have known an instance where the initial order was half-a-dozen cartes from a housemaid, these brought an order from the housekeeper, next came the governess, and finally the whole family patronised the lucky photographer to the extent of three figures in nearly every year. Here a good print in the first place made the first opening, and sustained good quality of work, with courtesy of manners, carried the business through.

It is unfortunate that most folks believe that salesmen are "born, not made," or there would be more eagerness to take advantage of the courses of lessons on salesmanship which are now to be had at most of the business colleges and polytechnics of our large cities.

THE WINDOW DISPLAY OF SPECIMENS.

(Continued from page 161.)

I believe that a mitred corner enhances the finished appearance of a passe partout framed specimen. At any rate, it is easily prepared as follows:—Place the top strip under the glass paper-weight, as in the foregoing instructions, and run the brush along the strip edge so that about an inch at both ends is left dry. Fix on the top edge of the sheet of glass as before, and when it is turned round cut off the little corner pieces, as shown in fig. 3, with the point of a lance or sharp penknife. The gummed ends are now wetted and pressed firmly down. This method leaves the corner with a neat mitre. The bottom edge is treated in a similar manner and the cover glass is ready to receive the print. The latter is now placed face down on the cover glass, and both are bound by fixing the overlapping binding paper to the back of the print support.

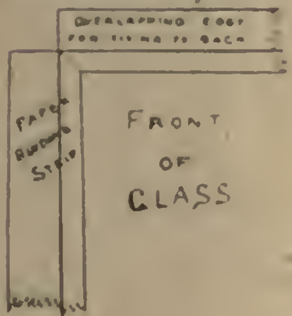


Fig. 3

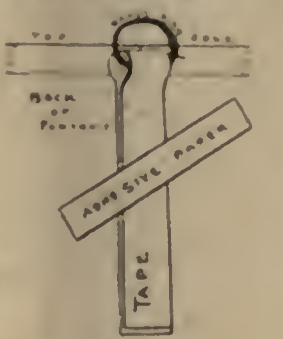


Fig. 4.

Should the specimen be required to hang on a wall or show-case, then a hanger must be provided. The small pictures are easy to deal with; it is only necessary to attach one of the hangers sold for this especial purpose. These hangers should not be used for the larger sizes. Procure some ¾-inch brass curtain rings, and several yards of black and brown tape, about ½-inch broad. Cut off a 10-inch length of tape and pass half of it through one of the rings. Now double the tape and fasten it to the back of the picture by means of a short strip of the adhesive paper, which has been strengthened with a coating of Seccotine. It is fixed so that just a little more than half of the ring will be visible over the top of the picture, as in fig. 4. Double the loose ends of tape over the fixed part, and fasten in this position with another strip of adhesive paper coated with Seccotine, so that the two paper strips complete the form of an X. When dry this method ensures a safe hanger for any size picture up to 15 by 12 inches. It is, of course, advisable to allow a few hours for the Seccotine to dry thoroughly. In perusing the above directions, one may come to the conclusion that it involves a good deal of work. In practice, however, it will be found to be both speedy and simple. Apart from this, the initial outlay is practically nil, when it is considered that a 15 by 12 costs only about 2d. for the binding paper, and that the glass is used over and over again.

Dismissing the specimens for hanging, we must now consider those intended for window display. As a general rule they are propped up or supported on flimsy wire stands. It is quite a simple matter to fix strut backs on passe partout framed specimens. All that is required is a short strip of blind-stick fixed on the back by means of a couple of inches of tape and Seccotine. For the smaller sizes the strut can be attached with a little piece of the adhesive paper. Personally, I do not think this a commendable method of exhibiting good specimens. After the trouble taken to prepare them for exhibition, they surely deserve to be shown to the best advantage—not as if they were merely advertising some maker's printing paper. It should always be remembered that comparatively large pictures seem dwarfed when viewed from the outside of the window.

I cannot conceive of a more artistic or effective method of exhibiting passe-partout bound specimens than by supporting them on neatly made wooden easel stands. Should there be any difficulty in purchasing the latter, they can be very quickly made to the required size. For this purpose a few lengths of flat blind-stick should be procured. These are cut into suitable lengths and fastened together by means of little nails or screws, as in fig. 5. A touch of Seccotine between the parts joined prevents twisting. The strut support is joined with a half-inch hinge. A brush over with mahogany stain or a solution of permanganate is all that is necessary to finish the stand. The tops may be rounded off and the whole stand neatly sandpapered previous to staining, if time permits. A most attractive arrangement of exhibiting the specimens is thus easily secured. They should be so placed that one picture does not hide another. Those who are fortunate in commanding two or more windows should display their very best work exclusively in one, and show less expensive work in the others.

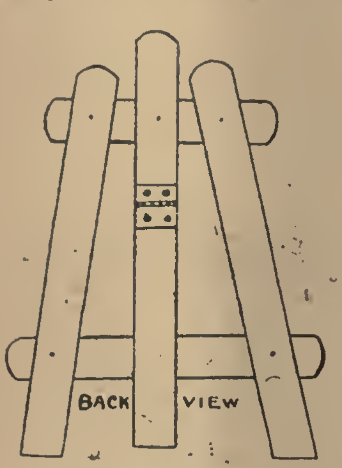


Fig. 5.

When the studio is situated in the centre of a busy industrial town, and is depending largely on a passing trade, efforts must be made occasionally to serve up something in the way of a novelty. I believe in "double printing" as an aid to this end. Many businesses in commercial thoroughfares and also at seaside resorts depend almost entirely on a good class postcard trade. Most proprietors have at last recognised that twenty or thirty orders averaging five shillings each pays better than one at about thirty shillings. The expense and worries attached to mounting are also saved where postcards are concerned. Many portraitists still labour under the fallacious idea that the public demand for postcards is only because it is an easy method of securing portraits at a reduced rate. As a matter of fact, the demand is largely based on the convenience of posting. As a general rule, the studios catering for postcards will have one or more "strip-printers" installed in the workrooms to assist in turning out the work to time.

To the proprietors of these studios I would suggest the following procedure for preparing a novelty secured by double-printing. To begin with, a cleaned-off postcard negative will be required. Now cut three sheets of dry-mounting tissue as follows:—The first sheet must be exactly the same size as the postcard glass, the second about 1-16th of an inch less all round, and the third should measure about 2⅞ ins. by 4⅝ ins., and with a touch of Seccotine near the centres the three are united to the glass, so that an even margin shows round each sheet of tissue. Finally, a piece of opaque paper cut to about 2¾ ins. by 4½ ins. is fixed on the centre, as in fig. 6, and our border glass combination, which we will call A, is ready for use. This arrangement is subject to variation according to individual taste. It will be found that a print from border-glass A will show different grades of opacity. A paper mask is now cut from a piece of opaque paper, with a central oblong opening just a shade less than 2¾ ins. by 4½ ins. As an experiment, lay a bust or sketch negative in the recess of the strip-printing machine. Place the mask on top of negative so that the subject will be "sketched" right in the centre, and run off a strip of six exposures in the usual way. Now remove the mask and negative, put the border-glass A in the recess, and run off the same strip on this, counting two seconds to each exposure. Development should show a set of six neatly "sketched" portraits "framed" within graduated borders.

For Rembrandts or any portrait showing a dark or semi-dark background, the border-glass is prepared vice-versa, that is, instead of the lightest tint surrounding the portrait, it should be the darkest. For this combination another cleaned postcard negative will be required. On the centre of this glass fix an oblong piece of opaque paper, size 2⅞ ins. by 4⅝ ins. Now cut out the centre from a piece of tissue the same size as the glass, so that a "frame" is left ¼ in. broad all round, and fix this on the glass. Now cut another tissue "frame" about ⅛ in. breadth all round, the outside edge measuring the same as the last, and finally attach this to the top of the combination, with a light touch of the mounting iron. Border-glass B is now ready for work. When complete, this should look like fig. 7. Printing with this border-glass is similar to the method advised with combination A, inasmuch as the opaque cut-out mask is interchangeable with both combinations. A print made with this arrangement will show the portrait standing out well in front of the border which graduates from the darkest tint nearest the centre, down to the lightest tint on the edge.

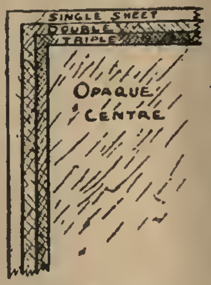


Fig. 6.

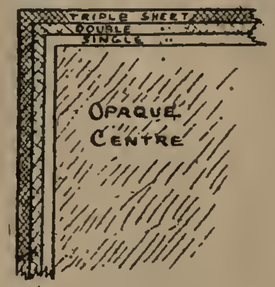


Fig. 7.

I can here anticipate a growl of dissent on the part of those readers who may condemn any double-printing system on the ground that it takes up far too much valuable time to secure appreciable results with precision and certainty for practical purposes. I would have been forced to admit this contention had we not been served so well with strip-printers. These machines obviously make the practice of double-printing a matter of extreme simplicity and rapidity. Take into consideration that a printer can run off a thousand postcards in a hour from any of the two border-glasses. The convenience of this system is unique when explained. For specimen purposes, first lay border-glass A in the printing recess of the machine, and run off a strip of six exposures. Remove the border-glass, and with the aid of the obscuring mask alternatively expose six different "sketch" negatives on the same strip. Development will then show a strip of six different complete specimens. On another strip repeat the former process, substituting glass B and six dark background subjects, and a further variety is thus secured. This procedure entails a minimum of trouble.

Another very pleasing and effective variation can be easily secured with the "sketch" negatives, by toning the portrait sepia, and leaving the border its original colour. This result is accomplished in this way:—Lay the fixed and well-washed strip on a flat surface, wipe off the superfluous water, and with a camel-hair mop brush, or a piece of cottonwool dipped in a moderately strong solution of ferricyanide and bromide of potassium, bleach the figure. Care should be taken not to touch the borders. Should the borders get bleached by accident, a touch of the original developer will rectify the affected parts. The strip is then given a rapid and thorough wash and toned with a solution of sulphide. A final wash, and it is ready to be dried, cut up, and finished. For printing orders by above explained system, much time can be saved if the printer would, whilst waiting other work, run off a number of strips with the borders only and stock into boxes marked A and B. In printing A borders a very rapid exposure is advisable, as a dark printed border would make them too funereal in appearance. When required for an order an exposed strip is taken out from the respective box, and, using the mask, the negative is exposed on this. The work is thus reduced to single printing. The printing bed, negative, and border-glass always being in the same position, it is obvious that accurate register is secured every time. The point I wish to emphasise is, that even should comparatively few orders result from these novelties, your efforts will be more than rewarded when you find the receipts soaring up for the usual lines which have themselves benefited by the presence of these novelties.

The clever and successful window-dresser endeavours to arrest attention, to induce those who have an immediate or remote desire for a portrait of themselves or their children to make inquiries within; it is then left to the adroit receptionist to complete the business.

MORRIS LEVY

MATT PALLADIOTYPE.

MR. W. H. SMITH, of the Platinotype Co., at the Croydon Camera Club, on the 27th ult., gave a practical demonstration of the new Palladiotype paper just placed on the market, and recently reviewed in these columns.

As some photographers appear to be rather mixed regarding the many printing papers made by the company, it may be useful to point out how the latest comer differs from the previously issued Palladiotype paper. The latter affords a comparatively warm sepia when printed to a good depth, and is supplied only with a semi glossy, or semi-matt ("Japine"), surface on either a white or buff base. The latest introduction gives a considerably colder sepia (many would call it a warm black, and Mr. Smith so referred to it), and has a dead matt surface, indeed the natural surface of the paper. It is supplied either with a smooth or rough surface on white stock, and smooth only on buff. It may be remarked parenthetically that the word "sepia" in a photographic sense mostly indicates a reddish brown far removed from the colour rendered by the sepia pigment—a particular shade of cold brown. The image of the new paper closely approaches the true sepia colour, but without any suspicion of a green hue to which washes of the pigment are inclined. Apart from its colour, the new paper in general characteristics and printing quality resembles the popular smooth Sepia Platinotype, but, owing to the greater depth of the image, more forcible prints are possible. On the other hand, as Mr. Smith showed, if a cool tone is desired, it is equally adapted for sketch vignettes in delicate vein, and owing to the true scale, there is no suspicion of any so-called, double toned effect.

His remarks on the surface of the papers bring a reminder that many professional photographers will not look at glossy or semi-glossy surfaces, whilst others exclusively employ them. The obvious deduction to be drawn is that there is a market for both, which appears to be overlooked occasionally by those who endeavour to cater for all. Few professionals care to, or dare, adopt the rôle of arbiters of taste in the selection of a printing medium regardless of the whims of their sitters, but there is little doubt that a bold adoption of this course must command respect, for if the photographer is striving to produce artistic work, as opposed to the more or less mechanical "usual," then assuredly he is entitled to carry through his work without dictation as to ways and means. The surface of a paper, *per se*, may be considered a small matter, but, as the demonstrator pointed out, there is always a perceptible difference in printing value between a glossy and natural surface paper, the former, for instance, giving more detail and transparency in the shadows. In the case of a natural surface paper, with its unfilled pores, greater luminosity and softness of image result, and yet from a distance the print tells in a way which no glossy surface can approach.

Storage and Printing.

The new paper, which may be deemed to be a variant of Platinotype, substituting the rare and expensive metal palladium, for the still dearer, and at present almost unobtainable, platinum, is manipulated in much the same way, and kept in a calcium storage tube. It, however, has not the same tendency to produce a shade differing slightly in colour to that due to light-action, as is the case with some Platinotype papers, and, accordingly, the picture is not so easily degraded by the paper absorbing moisture. It is, however, rather sensitive to stray light, and only weak daylight, or artificial light, should be used for watching the growth of the initial image, which is about the same as the cold-bath Platinotype papers render, viz.: all detail, except in the highest light, is visible in varying degree. Many, Mr. Smith said, find a safe edge to the negative of assistance, as it forms a good starting point for estimating high-light detail, especially useful for landscape subjects, including a printable sky. No special negative is required; one which gives a bright P.O.P. print will be found about right, but there is plenty of latitude.

Developing and Clearing.

The prints are developed in a bath of citrate of soda, or potash, acidulated with citric acid, and, to remove the residuum of iron salts, they are cleared in three baths of the same constitution diluted with an equal bulk of water. When the *third* clearing bath shows signs of yellow colouration, the *first* clearing bath is thrown away, and the second and third are then respectively employed as the first and second, fresh solution being used for the third clearing bath. Development at 60° to 65° Fahr., the normal temperature, takes about 15 seconds, and, as is the case with Platinotype, correctly exposed prints cannot be over-developed.

The prints are slid into the developer face up, and then turned over till development is complete. Somewhat over-exposed Platinotype prints can be saved by arresting development by plunging them into the acid bath used for clearing. Some operators over-print habitually to be on the safe side, but it is bad practice, as a loss of quality usually results, and the procedure is not possible with Palladiotypes, as they will continue developing in the clearing bath. An over-exposed Palladiotype can, however, be saved by a stop bath consisting of peroxide of hydrogen (20 vols.) 1 oz.; *distilled* water, 10 to 20 *ozs.*

The developer will keep indefinitely if kept up to measured bulk by the addition of fresh solution, and occasionally strained through muslin to remove matter in suspension. The clearing baths can also be bottled for further use. It is preferable to make up the developer with distilled or, at least, boiled water, but Mr. Smith said so far he had found no perceptible deposit had attached to the prints by using tap water; possibly, if very hard, this might occur. He had calculated that 1 oz. of the citrate and 50 grains of the citric acid are sufficient to develop and clear prints of an area representing a full size sheet, 26 x 20 ins.

The Palladiotype developer and clearing baths have no tendency to injure the beautiful surface of the paper employed for coating. An undue immersion of matt Platinotypes in the oxalate and acid baths does tend to destroy their natural bloom. A short washing suffices, four or five changes for fifteen minutes being ample; running water is to be avoided with the matt paper. The new and old variety of Palladiotype must not be developed in the same bath, as the former has a tendency to lower the sepia tone of the latter, but they may be cleared and washed together. His remarks that evening were chiefly concerned with the matt paper, but so far as applicable they covered both brands.

Modifications.

With negatives on the hard side the well-known expedient of working on the back, or flashing the paper to white light, may be employed. For weak negatives, the addition of a small quantity of bichromate of potash to the developer will be found of great service; especially with portrait negatives modelling in the lighter tones and high-lights existing in the negative, but hardly apparent in the print, being accentuated in a wonderful way, and with no tendency to a sharp cut unless the oxidiser is overdone. If the shadows permit, printing can be carried a distinct shade further with advantage. The salt has been employed with Platinotype prints to the same end, but then the oxalate is always destroying its action, which is not the case with the Palladiotype developer, or only to a very small extent. A convenient method is to dissolve a quarter of an ounce of the bichromate in water to make 10 ozs., and, employing a drop bottle, to add *from* 1 drop for every ounce of developer. A fair bulk of solution should be used, which will vary according to the size of dish, and for every four or five half-plate prints developed one drop of the bichromate solution is added. Even such a minute quantity as one grain of the bichromate to a pint of developer has an appreciable action, and the developer may be kept for a day or two without losing its power of giving increased contrast.

Discussion.

In the discussion, many members remarked on the good visibility of the initial image, which, in their opinion, was stronger than with cold-bath Platinotype papers. Whether right or wrong, one thing was clear—that metallic-filament lamps afford a good and safe light for examining the prints. The President, Mr. A. F. Catherine, commenting on an explanation given by Mr. Smith of the action of the bichromate, said it appeared to be analogous to that of the Howard Farmer reducer on negatives. An equal amount of deposit was removed from shadows and high-lights (the demonstrator assented). He was much struck with the fact that a natural-surface paper, owing to its pores being unfilled, gave greater luminosity. This undoubtedly was the case, and a more artistic effect was also obtained. Mr. W. H. Claypole inquired if the addition of the bichromate lengthened the period of development, and received an answer in the negative. The eagle eye of the secretary, Mr. J. M. Sellors, detected a slight extra warmth in the prints developed in the bichromate developer, as is the case. Mr. J. Keane, whose ex-presidential dignity is slowly reverting to the normal, pointed out that (in the case of a minor official—who shall be nameless) filling up the pores as the evening progressed invariably resulted in greater luminosity, and then dexterously avoided current periodicals moving rapidly. A most hearty vote of thanks was accorded Mr. Smith, by then in the train *en route* for "New Jerusalem."

A PERSONAL SYSTEM OF USING THE BEE METER.

Correct exposure, as I use the term here, is that exposure which will produce a negative by normal processes of development, from which a print made by normal processes will reproduce the details and light and shade of the subject or scene as they appeared to the observer at the time of making the exposure. I mean by this what is generally called a "record" print. From this correct exposure the experienced photographer will deviate according to the results desired.

To predetermine correct exposure, it is first quite essential that you know your shutter speeds. I regret to say that the speed markings on many moderately-priced shutters are reputed to be far from accurate; the slower speeds, it is stated, generally working faster than marked, and the faster speeds more slowly than indicated. There are several shutter-testers on the market—the Wynne and the Pickering seem to be in most general use. I have a Wynne. If you don't care to buy a tester, take your camera to a dealer and have the shutter speeds tested; otherwise you cannot know what your actual exposures are.

Now, assuming that you *know* your shutter speeds, the next thing is to know how to make an actual test of the light which illumines the subject or scene to be photographed. There are several reliable actinometers (light-measures) on the market. As my own experience has been largely confined to the use of the Watkins Bee meter, and as I have a method for its use which I think is in the nature of a real photographic discovery, I shall deal only with that.

When I first began to use the Bee, according to directions, I felt that it was appropriately named—I was stung. It was the happiest day of my life, photographically speaking, when I came to the conclusion that my Bee was an abominable little liar—or a little abominable liar—as you like it. But since I have discovered this weakness in its character, and have learned how to make it tell me the truth always, we have ever been inseparable companions, together with a stop watch which I picked up in a pawnshop "for a song."

With the Watkins Bee meter you will receive a little book of instructions and a card speed list of plates and films; so Mr. Watkins has done much of the work for you in determining your plate speeds. However, as he says, these "must be regarded only as approximate, and a guide to the first trial; for, in the first place, few makes of plates are always issued at the same sensitiveness, and, in the second place, different makers vary in their idea of what a negative ought to be." As an assistance in determining the speed of your own favourite plate, I suggest that you make several exposures, at different speeds, on the same plate, with the aid of a multiple attachment or home-made masks; or expose several plates at different shutter speeds. Develop them all together in a tank for the same length of time, and thus determine the speed of your plate according to the type of negative you think best for your own use. If you make several exposures on one plate, be sure to centre your lens for each exposure immediately in front of that portion of the plate to be exposed, in order that each portion may receive the central rays.

Now for the light-test. Here I shall have to digress very much from Mr. Watkins' instructions. Light is light, whether in London or in Philadelphia, U.S.A. (where I reside), and Mr. Watkins' instructions have ever been a marvel to me. Briefly, as follows:—"Test the light which is actually illuminating the shadiest part of the subject to be photographed. . . . The light which falls upon the worst lighted part of the subject in which detail is required in the negative is that to be tested. . . . It is only when there are no shadows of importance or in open landscape that the direct sunlight test should be taken for the A number." The A number is the number of seconds required to darken the sensitive paper in the meter to the same depth of colour as the standard tint on the meter.

When I first began to use the Bee meter I made forty or fifty negatives (in various experiments) of my home and the house adjoining with a 7 by 5 camera. A concrete instance of following instructions will do much to illustrate my method of pre-determining correct exposure. My own house at that time was a three-storey frame building with a porch. The lower part of the house had been painted a canary colour; the upper half was plain shingles, weather-stained, a murky brown; the roof was of stained black shingles; the window casings, porch, and pillars were white; the front door was mahogany finished. The adjoining house was a buff colour, with white trimmings and black roof. I desired an exposure that would give detail in the shade of the porch, also in the shadow side of the house, show clearly the outline of the mahogany-stained door, and give good colour values without a screen.

The instructions given in the Watkins' Manual (sixth edition, American, 1915, p. 42) covering this kind of a subject are as follows:—"If it is a street view, hold the actinometer close to the wall or house in the shade." This method might apply to a narrow street scene, close up, but would indicate an unnecessarily long exposure in such an instance as the one I am discussing, where the front of the house received unobstructed sunlight. It would also make it almost, if not quite, impossible to get a sharp picture, with foliage, if the wind were blowng and a small stop used. One day in August, at 1.30 p.m., I got a direct light-test in six seconds, by stop-watch (I was then living at Brooklyn, N.Y., U.S.A.). I also made a test as per instructions, of "the most lighted part of the subject in which detail is required," *i.e.*, under the porch, near the bottom of the door, and also on the shadow side of the house. The light was at an angle of about 45° to the front. The shadow test was made in sixteen seconds, which would indicate an exposure as per instructions, of ½ second at f 20, using a plate rated at 150. The direct-sunlight test (6 seconds) indicated an exposure of 1-6th of a second. The first exposure, of course, I knew to be unnecessarily long, and the second very full. So I doubled my plate rating, making it 350, and with 6 as the A time, found an indicated exposure of 1-11th at f 20. I used my 1-10th speed (verified) and got "full and plenty" exposure. The lens used for this, and most of my outdoor experiments, was an 8 by 5 Gundlach Convertible Rectigraphic. The camera was about 100 ft. from the nearest part of the nearest house.

After many tests (extending over a period of two years) of various subjects, under different light conditions, and at various distances from the camera, I find that whenever the subject is in direct sunlight (not wholly in shadow) the direct sunlight should be tested, and that the only occasion for using a plate at listed rating for subjects of average colour or contrasts that are distant from the camera at least twice the focal length of the lens, considered in feet, is when the light is ahead (shadows all falling towards the camera), or when, for some special purpose, an extremely full exposure is desired. For interiors and portraiture the plate should be used as rated by Mr. Watkins.

In the latter part of the Watkins' booklet of instructions for the Bee meter I find this qualifying statement:—"In calculating for shutter exposures, therefore, take for the actinometer number *half* the value of the light-test, and the exposure indicated will be the minimum efficient time." The "personal equation" enters somewhat into the tinting process. I keep a light-diary and I base the correctness of my readings upon Mr. Watkins' statement on p. 33 of the Manual:—"The standard for the actinometer is that it darkens to its standard tint in best light (that is, unclouded mid-day summer sunshine in England) in two seconds." Only a few times at mid-day in all, in midsummer, have I got tests in two seconds; more frequently they were in three; oftener still—between 11 and 1 o'clock—the tests were made in 3½ or 4 seconds. I mention this so that you may understand that my light-tests are at least sufficient.

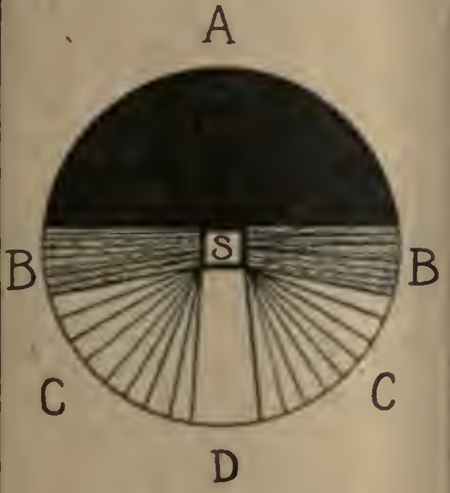
In taking the light test, you are advised to tint until the sensitive paper shows the same depth of colour as the standard tint, but not necessarily the same exact colour. Wee wific says, "Bake the tint until it is well done, but not burned." Holding the meter at arm's length and looking at it through your upper eyelashes will aid materially. The use of a pair of light blue glasses is recommended by some.

If you can't pick up a stop watch cheaply, as I did, you can use the second hand of the dial of your Ingersoll for slow lights; and for fast lights you can soon acquire accuracy by counting as follows:—A half-and-one, a half-and-two, a half-and-three, etc. Try this with your watch until you acquire the correct speed. It's easy.

On page 35 of the Watkins' Manual I find this:—"The Watkins' standard for plate 1 (hypothetical) is that with full mid-day summer sunshine in England, and a lens opening of *f*/8, two seconds' exposure is correct." Assuming that I am working with 100 plate, and the actinometer time is two seconds, the exposure indicated at *f*/8 by the Bee meter and Mr. Watkins' method is 1-50th sec., using the regular dial. (There is also a snapshot dial on the market, which indicates half the exposure of the standard dial.) Yet I find on page 59 of the Manual, the following statement, which does not seem consistent with the foregoing:—"It is useful to remember that the Watkins' speed number gives, without calculation, the highest allowable shutter speeds for the plate with mid-day summer sun (2 seconds tint time) and *f*/8. Thus, with plate 100, the shutter can be used up to 1-100th." No special instructions are given by Mr. Watkins, either in the Manual or the Bee booklet, for such variations of exposure as are made necessary by the direction of the light—light ahead or straight across, for instance. Surely his shadow test cannot cover this, because the shadow test would be the same were light ahead or straight across.

After repeated experiments I have formulated and proved the effectiveness of the accompanying key scale, which is a working summary of my method of predetermining exposure—full exposure, too. Direct sunlight is to be tested for the A time, except as indicated otherwise. The necessarily long exposures indicated by the regular Watkins' method may be partially accounted for by the greater efficiency in shutters since his system was originated, and partially, perhaps, by the almost general practice, in England, of using considerable bromide in the developers.

Where the subject or scene is wholly in the shade, or practically



KEY SCALE

for use with the

WATKINS' BEE METER

for outdoor, inland exposures and direct light test (not shadow test).

S—Subject or scene.

A—LIGHT AHEAD. (All shadows falling towards the camera.) Use lens hood and rate plate as listed.

B—LIGHT ACROSS. Use lens hood and rate plate one speed higher.

C—FRONT-SIDE LIGHT. (Light to the side and back of camera.) Rate plate two speeds higher than listed.

D—FLAT LIGHT, or with subject wholly in shadow. Rate plate three speeds higher than listed. See instructions herewith for special light test for subject in shadow and calculating focal value of stop when working with subject closer than two times the focal length, *considered in feet.*

If light test requires more than 20 seconds, discount the time ten per cent.—i.e., 30 seconds equal 27.

For taking A (actinometer) time with clouds in sky, see fuller instructions herewith.

HANDY RATINGS

for C (front-side light).

Medium Speed Plates	250
Average Fast Plates	400
Extra Rapid Plates and Speed Films	500 to 600
Extreme Speed Plates	700 to 800

(Don't use these plates at all if avoidable.)

To calculate mentally exposures at *f*/8 (U.S. 4) with the HANDY RATINGS divide the A (light) time by the plate speed.

Example.—Actinometer (A) time, 8 seconds; plate speed, 400 = 8/400 = 1/50 of a second. Done in a jiffy.

THESE EXPOSURES

are scaled for outdoor, inland subjects or scenes of *average colour* or contrasts, with no dark foliage or strong, unillumed shadows in the immediate foreground and with the nearest object at a distance from the camera of at least *twice the focal length of the lens,* CONSIDERED IN FEET. Thus, 8 inch lens x 2 = 16 feet.

No allowance need be made (for subjects of this kind) for the decreased *f* value caused by the extra bellows extension when working so close as this.

The exposure indicated will be practically the same for subjects or scenes up to distant views, which will require only half the indicated exposure.

The direct sunlight should be tested for the A time except when subject is wholly in shadow. See D.

Average snow scenes and beach views also require only one-half the indicated exposure.

Sea *only* and clouds, 1/4 to 1/6 of indicated exposure.

For dark-coloured subjects, extreme contrasts, or heavy foreground give from twice indicated exposures upwards.

For interiors follow the instructions given in the Bee Booklet.

A lens hood should *always* be used with LIGHT AHEAD or STRAIGHT ACROSS. It is advisable at all times.

For HOME PORTRAITURE, plain lighting, use the plate at 1/16 of listed rating, and take 1/16 tint as the A (actinometer) time. Expose at *actual f* value of stop, according to the bellows extension. See fuller instructions herewith.

so (deep woodland, for instance), of course the meter should be held in the position of the subject, if possible, but facing the largest volume of general lighting, not the few scattered rays of direct light that may penetrate the view, but the plate should be rated as for *flat lighting.* See key scale. If the scene is of such a kind (intervening obstacles, a brook, for instance) that the meter test cannot be made in the scene, make it in the shadow of the body at arm's length. For outdoor pictures of full length figures, groups or portraits, wholly in the shade, the light should be tested in the position of the subject, with the meter facing the sky, and the plate is to be rated as for *flat lighting.* For head and shoulder portraits, however, whether indoors or out, or for other subjects very near the camera, it will be necessary to calculate the decreased *f*/value of your stop, because of the extra bellows extension. Thus, if you are working with an 8 in. R.R. lens at *f*/8 (U.S.4), but with bellows extended, so that the lens (diaphragm, practically) is 11 inches from the plate (3/8 more than the focal length), your *f*/8 (U.S.4) stop becomes *f*/11 (U.S.8), and the exposure indicated by the Bee for *f*/11 (U.S.8) must be given—*i.e.*, double that at f/8 (U.S.4). When working in mid-summer with a perfectly clear sky (no light clouds nor haze), and if the paper darkens quickly, you can verify the accuracy of your test by making a trial with the Bee held at arm's length in the shadow of your body and facing upward toward the sky. It is quite a coincidence that with such a light-condition—perfectly clear sky—the test will almost invariably be made in the time indicated on the Bee meter light-scale three stops higher than the direct sunlight A number. For instance, if you make a direct sunlight test in 6 seconds, you will find that the body-shadow test will be made in 16 seconds. If it requires longer than that—with a clear sky—you may be sure that your direct-light test was wrong. These figures will not be clear to you unless you have a Bee in your hand.

We now come to a very important detail in making the light test for open views, and must depart slightly from the method of testing direct light. Where there are light clouds or fine haze in the air they act as reflectors or secondary sources of light coming from other directions, thus illuminating the shadows and permitting somewhat decreased exposures. For photographing buildings, a sky with light clouds opposite the sun is much to be desired. On such a day two tests should be made; first, the Bee at arm's length in the shadow of the body. These two times (seconds) should be added together and divided by four for the A time. Thus, if the direct-light test is 8 seconds and the body-shadow test is 16, the sum (24) divided by 4 gives 6 seconds as the A time.

After having purchased one meter, if you are at all ingenious you can easily make another for any other member of your family by using a round pasteboard pill-box and the standard tint which comes with each package of refills. With this you can easily get the A time and mutually calculate the exposure, without a scale, by using the handy ratings (as per key scale) which suits your film or plate.

For home portraiture work use your plate at the listed speed; but as it has been determined by Mr. Watkins that the first visible darkening of the sensitive paper in the meter requires only 1-16th of the full tinting time, you can save time by rating your plate at 1-16th of the listed speed and taking the 1-16th tint as the A time. Thus, if you are using a plate listed at 250 (Watkins), rate it at 16 (practically 1-16th of 250), and, with a 1-16th tint obtained in 16 seconds, you will find an indicated exposure of 1 second at f/8 (U.S.4) for the average "broad" or "plain" lighting, three-quarter face portrait, medium colour dress, with sufficient illumination thrown into the shadow side (by a reflector or light walls) to make it transparent. In testing for a 1-16th tint hold the meter in the position of the subject, facing the light. The line between the tint and the no-tint should be sharp and distinct without taking it nearer the window to look at it. Make a first trial, turn the disc, and if the tint seems too dark, try again, exposing a few seconds less, keeping in mind that a decided edge must show between the tint and the no-tint.

Important. In portraiture, indoors or out, you must calculate your exposure for the stop at its actual working value, according to the bellows extension, as explained in a preceding paragraph. That is particularly necessary when using a single combination of a convertible lens, or when using a supplementary portrait lens with your regular lens. To avoid distortion (false perspective) do not work with the lens nearer the subject than 10 times its actual working focal length. I have seen pictures in the exhibitions that made the subject appear as if she had a "swell affair" toothache.

In portraiture, particularly, you should avoid the too frequent custom of using the swing-back or drop-bed for equalising the focus. Wherever the swing-back is used for this purpose it always causes distortion—always. In outdoor landscape views it may not be noticeable, but it is there. You cannot use the swing-back for equalising the focus in near and distant objects or on the near and far side of a single object without causing a larger than normal image of the near side and a smaller image of the far side. Reason it out for yourself and you will get better "likenesses."

For home portraiture you must not use the Bee for "against the light" readings in the same way as indicated by the key scale for outdoor work. The method outlined in the foregoing paragraph applies only to "plain" or "broad" lightings. For Rembrandt lighting give double the exposure indicated for plain lighting. For a full Rembrandt profile give three times the exposure indicated for plain lighting. For the shadow effect give four times. For edge effect five times. For line effect six times. I advise you in general to work for rather softer, detailed negatives. From such you can easily make, by the usual methods, negatives with any degree of contrast.

MILTON M. BITTER.

FORTHCOMING EXHIBITIONS.

April 18 to May.—Hampshire House, Hammersmith, Photographic Society Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Fixing Large Batches.

HAVING, in common with other photographers, been troubled by imperfect fixation of prints, I have hit on a system of working which does away with spoils, and while saving the use of a second bath, has an advantage over that method.

The professional's trouble is usually connected with large batches of bromides, for with negatives or single prints it is possible to note or examine the action of hypo solution. Bromides give no definite visible signs of a fixing bath's condition, and when large quantities are fixed together there is the possibility of complex chemical action which is difficult to detect or examine. To work with confidence, it becomes necessary either to use hypo extravagantly or else use a method which has been proved by experiment.

The practice of using a second fixing bath is probably the most reliable yet put forward, but it has met with two objections, one of which has some foundation.

The first is, that with hypo going on for 1,000 per cent. dearer than it was, a second bath is extravagance, and on the face of it it seems obvious, but in practice a second bath can be used without any extra expenditure if things are managed carefully.

The second objection is not so easily met; it is this, that prints not thoroughly fixed in the first bath, if transferred to a second one before encountering daylight, will turn out perfect black and white, but if wanted for toning will result in a mixture of sepia and blue.

The cause of this is, that by reason of not being immediately attacked by the fixing bath, the developer in the prints has had time to change—most probably oxidise—producing some compound which is impervious to the fresh hypo, and will not tone. It seems necessary that prints for toning be attacked all over by the fixing agent *immediately* after development, and so a second bath becomes superfluous.

After making the fixation of large batches of prints the subject of experiments lasting some months, I came to the conclusion that the most important factors to be considered are, the quality of the hypo used, the temperature of the bath, and the condition of the print when immersed.

The most reliable formula I found was the following:—

Hypo.	1 lb.
Potas. metabisulphite	1 oz.
Water	80 ozs.

At a temperature of 65° or a little higher, this solution was capable of thoroughly fixing ninety strips of post cards (six on) in three lots of thirty each, using the whole 80 ozs. in the usual strip dish (24 x 7 x 3 approx.).

The action is subject in the first place to the quality of the hypo, some samples on the market recently being only capable of about two-thirds the work. This variation can only be safeguarded against by careful watching of the first bath made from a new purchase. The temperature is, of course, important, a very cold bath being slower and more uncertain, and to assure complete fixing of the whole ninety strips every time, it is necessary that they be developed up without forcing.

Whether it is that a forced print needs more hypo to fix it, or that by carrying a greater load of developer into the fixer it exhausts the latter quickly, I can't say, but it seems that a batch of forced prints needs more fixing than an equal number of smartly developed ones.

The method of handling the prints is to give a quick rinse in clean water, and to immerse quickly in the fixing bath, turning them over once or twice and leaving, face up in the case of prints that sink, and face down with any that float.

Another method tried with success was to keep a large quantity of solution at hand, and starting off with 80 ozs., to add a pint of fresh after every thirty strips, or equivalent, had been fixed, baling out a little (before adding new) when necessary. It is possible to work this way all day with fairly good hypo at the right temperature, the prints receiving a fair turn over and at least seven minutes' stay in the solution.

I have described this method as comprising the use of metabisulphite, but, of course, a similar way of working can be practised with any known formula, the important point being in the way the bath is used rather than the particular proportions of its formula, though, of course, it is necessary for the worker to know its composition.—Thermit.

A Time-Saving Hint in Pinning Enlarging Paper to Easel.

People who work in the enlarging room generally fasten the bromide paper on the easel with push pins, but much cheaper and quite as effective for this purpose are milliners' pins. These are pins about 1 inch long with black glass heads, and sold in small bundles about 25 to 30 for 1d. or 2d. They are exceedingly sharp and handy to use, but, like push pins, are very easily mislaid and lost in the darkroom. To get over this difficulty a small white basin, about 3 ins. in diameter, with a rim on similar to a pudding basin, should be bought at any earthenware shop. A hole the right diameter should be cut in the board to receive it, or on the board on which the easel slides on, or anywhere close to hand. The hole should be sufficiently wide and deep to allow the rim of the basin just to sink level on the face side of the board in which it is placed. The pins should be kept in this; they are always very easy to find, and cannot get misplaced, as they find their way to the bottom of the basin and can be picked out and replaced quite easily and are a pleasure to use. If this plan is adopted a great deal of trouble and annoyance is saved for the worker.—F. Hinge.

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Tribunal Appeals.—At Southampton, Mr. Arthur H. Emanuel supported the application of a photographer, 34, classified C2, married, with one child, for his exemption on the ground that, after being twice rejected, he invested his capital in a business. The applicant was granted a temporary certificate of three months.

At the Hampshire Appeal Tribunal a photographer and picture-frame maker, 34, appealed for further exemption, but the appeal was dismissed.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, April 15.

City of London and Cripplegate Photographic Society. Exhibition.

Tuesday, April 16.

Royal Photographic Society. "The Structure of the Photographic Image." F. Krohn.

Birmingham Photographic Society. "X-Rays and their Use during Present War." Sergt. J. F. Brailsford, R.A.M.C.

Sheffield Photographic Society. Members' Exhibition.

Monklands Photographic Society. Annual General Meeting.

Manchester Amateur Photographic Society. "Scenes in Mid and East Cheshire." Rev. S. R. Laundy, M.A.

Wednesday, April 17.

Croydon Camera Club. "Impressionism and Post-Impressionism." J. Vacy Lyle.

Leith Amateur Photographic Association. Social Meeting, with Whist.

Thursday, April 18.

Hull Photographic Society. Annual General Meeting.

Huddersfield Naturalist and Photographic Society. "Some Chronicles of an Ancient Kingdom." R. Mackay.

Hammersmith (Hampshire House) Photographic Society. Annual Exhibition.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, April 9, Mr. John H. Gear in the chair.

The Secretary announced that the honorary fellowship of the Society had been conferred upon the following ex-presidents:—Sir Henry Trueman Wood, Mr. Furley Lewis, and Mr. John H. Gear.

Two short lantern lectures were the fixtures. That by Mr. F. Humpherson dealt in an interesting way with the scenic attractions of Grasmere, and included some references to the association of Wordsworth with the district. Mr. B. C. Wickison's contribution, announced under the mysterious title of "Nicholas and Napoleon," turned out to be a most interesting novelty in lantern lecturettes. Nicholas and Napoleon are two cats, whose antics Mr. Wickison had portrayed with great technical ability and with the introduction of much humour in a series of high-speed photographs. A piece of Nature photography which was something entirely fresh, and provided a suggestion for variations which, perhaps, may be forthcoming from members of other societies, the syllabuses of many of which would gain in interest from a fixture or two of this description.

On the proposition of the Chairman, the very hearty thanks of the meeting were accorded to the lecturers.

CROYDON CAMERA CLUB.

A gala performance of the Autotype, or carbon process, was given by Mr. H. P. C. Harpur last week, and all were glad to welcome an old friend lately seen but seldom. Munition-making makes late hours, and then he is a three-striped station sergeant in the Special Constabulary and an active member of a local food club for the rearing of poultry, and especially pigs.

The exposition, which was a great success, preserved a remarkable degree of continuity, for, usually, his demonstrations have all the orderly sequence of a revue, as Mr. Harpur scorns notes, and if one has no objection to starting at the end and leaving off at the beginning, notes, obviously, are superfluous. The Autotype Co., so to speak, were the scene-shifters, and he graciously allowed the company to do itself proud in the number and size of the undeveloped prints. Carbon printers may come and go, but none can ever approach Mr. Harpur in the art of squeegeeing regarded as an agency for distributing water to a distance.

It is the final flick at the end, something in the nature of a mule's kick fast repeated, which does the trick. Possibly if he occupied the centre of the arena at Olympia a spectator in the gallery in the line of fire might escape unscathed, but it is doubtful. In a prior demonstration many in the club room got it badly at close range—opened their mouths to expostulate just in time for the next flick, and then scattered, mumbling as they went. On this occasion a kindly word of warning saved all but the wall-paper.

It is not desirable to narrate in detail Mr. Harpur's procedure, which departs from the normal in most respects, and if adopted by other than a genius might lead to disaster. One bold experiment, however, well illustrated the simplicity of the process. Five members were selected who had never worked it, and they, in turn, all on their own, squeegeed and developed a print, and every picture proved a success. Needless to say, after this introduction to a process of magnificent quality and many colours, the first print will not be the last. A highly interesting evening terminated with the usual row between the demonstrator and the office boy, and a most hearty vote of thanks to the former. In proposing it, the chairman, Mr. W. H. Claypoole, said he always regarded the tanning action of light on bichromated gelatine as the most wonderful in photographic procedures.

Commercial & Legal Intelligence.

NEW COMPANIES.

British Photographic Manufacturers' Association, Ltd.—Registered on March 28 as a company limited by guarantee, with 100 members, each liable for £5 in the event of winding up, to promote and protect the interests of the British photographic trade. The first directors are:—E. W. Houghton, Strathnairn, Teignmouth Road, Cricklewood, N.W.; F. E. Greenwood, Park Road, Barnet, Herts; F. J. Jenks, 18, Richmond Road, Ilford; J. Hill, 2, Neeld Crescent, Hendon, N.W.; E. B. Cook, Lyncroft, Woodford Green, Essex: G. M. Bishop, Clere, Wellgarth Road, Hampstead, N.W.: J. A. Sinclair, 57, Shadella Road, Herne Hill, S.E.; T. Illingworth, Ellerslie, Willesden, N.W.10; W. S. Hobson, Stoughton Street Works, Leicester; C. F. S. Rothwell, Town Lane, Mobberley, Ches.; A. G. Pickard, Redcroft, Hale, Ches.; F. E. Butcher, 4, Eliot Vale, Blackheath, S.E.; A. Edwards, The Little House, Warwick. Registered office, Sicilian House, Southampton Row, W.C.

News and Notes.

Unauthorised Photography.—At Bexhill last week two ladies were fined 10s. each for using cameras in the streets without a permit.

Textile War Portraits.—Mr. A. Langfier, art director of the Portrait Textile Co., Ltd., had the honour last week of submitting a collection of official war portraits (by the "Textile" process) to H.M. the King at Buckingham Palace.

Lantern-Slides with Rectangular Masks were not used until about the year 1857, said Mr. A. H. Baird in a recent lecture on "Old Lantern Slides of Old Edinburgh." It was not possible to fix the date definitely, but about this time the universal circular picture began to give place to those of other shapes.

Novel Effects in Portrait Glass Positives.—In their "Trade Notes" for April, Messrs. Rajar, Ltd., offer some further hints and suggestions on the glass positive or Doretype portrait which formed the subject of the article in our issue of January 4 last.

Transparencies made by contact are useless as the image would be reversed, and, as it is difficult to obtain reductions with most enlarging cameras, the following device is useful, and only necessitates the use of another small camera fitted with a short focus lens. The bellows and lens of the enlarger are removed, thus leaving the illuminated negative (glass side out), the small camera is set up at a suitable distance parallel with the negative, and the image focussed sharply on the ground glass. A lantern plate or an "Ordinary" slow plate is placed in the dark side of the small camera, the exposure made, and the positive developed and fixed. A few trials will soon determine the depth of printing, the aim being to get a clean thin transparency, considerably lighter than a lantern slide.

In backing up the positive with paper of suitable colour, care must be taken to ensure good contact, and this can be got by placing the paper on a piece of glass the same size as the positive, binding the two glasses together. Opal can be used, and even polished metal to obtain different effects.

White background sketches can be made, the vignetting being done by using a black card vignette and keeping it moving fairly close to the negative. The sketch background can be drawn in on the backing paper by placing it temporarily in contact with the glass side of the positive and working in a re-touching desk. The photographer's signature or the actual signature of the sitter could be written on the backing paper, and it is an easy matter to use a bromide print as backing. A portrait (much reduced), say of a lady, could be vignetted in one corner of the backing paper, the other part being kept white, whilst the positive could be of a gentleman posed suitably to indicate that his thoughts are centred on the "object" in the corner—other composite picture ideas may occur to our friends, such as a soldier's portrait, with a coloured facsimile of his regimental badge in one corner.

Fire-light effects are easily produced by using a suitably coloured backing paper. An ivory effect is got by using a smooth cream paper. If coloured positives are done, it is necessary to use transparent dyes on the film side, but some of the colouring can be done on the backing paper. The most perfect results can only be obtained by getting the positives quite free from fog or veil, and it may be necessary to pass them through a weak clearing bath.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

OVER-TIME.

To the Editors.

Gentlemen,—With regard to "Thermit's" letter in your issue of March 29 in which he remarks upon some abuses of the over-time system, I think that most professional photographers are keen enough to notice whether lagging in actual business houses is going on, especially when they have entered into an arrangement to pay for over-time. Leaving out the laggers and wasters, they are better keeping to proper business hours; their over-time is nothing worth.

Owing to the shortage of genuine "efficients," operators and assistants have to put in many hours' over-time to cope with the rush of work, otherwise I'm afraid most businesses would be in a state of chaos and muddle. In pre-war days a really good assistant interested in his work did not mind putting in extra time at the Christmas rush: it is the usual thing when working for an appreciative employer. But the times now are such that assistants are kept working long after business hours.

I contend that this over-time should be paid for in a fair way, or a substantial increase of salary given to meet the extra cost of living, etc. This is the only fair solution of this vexed question, and I feel sure would be beneficial to both employer and assistant, and would clear up much dissatisfaction and unrest. Most photographers are doing splendid business, and if the situation demands over-time they can afford to pay for it. The laggers can easily be detected by a business man or photographer who understands his business, and if they must be kept in his employ, made to keep to regular business hours.

Pro.

SOFT WATER AND BLISTERS.

To the Editors.

Gentlemen,—In regard to the correspondence recently on blisters on bromide prints and your own remarks this week, I have had some experience of this trouble at one time or another, and, after careful experiments and experience with hard and soft washing water in various parts of the country, I can say emphatically that the cause of blisters in sulphide toning in most cases is the use of naturally soft water—artificially softened water does not seem to have the same effect.

It is due, as you say, to osmosis, and the only preventive is to pass the prints direct from the sulphide solution into one of a fairly high specific gravity. After many experiments, I have found ordinary table salt the best thing to put in the water. Make a fairly strong solution, and pass prints direct into this. After remaining about 10 minutes, put the dish of prints, still in the salt bath, under the tap, and let the dilution to plain water take place gradually. I have never been troubled with blisters (after sulphiding) since I adopted this plan.

Prints must be handled just as carefully, though, as not even a salt bath will prevent a blister when a "kink" has occurred. This applies to prints bleached in the usual ferricyanide bath. With a bichromate bleacher I have found blisters occur badly, and I attribute that to the hydrochloric acid, which, I believe, attacks the gelatine if too strong. I have also had blisters in fixing with certain makes of paper, but not with all. I have been using almost exclusively a fairly rough paper (Wellington's "Chamois"), and I have never had any trouble with blisters in the hypo, and the only addition I put to this is plain potassium metabisulphite.

In my opinion, a good deal of blistering is the result of using hypo eliminators, especially in districts where the water is very soft. In Cornwall (at least, in this part) the water is excessively soft, and without the salt bath it seems impossible to avoid blisters.—Yours faithfully,

ANDREW C. GLOVER.

27, Bedford Road, St. Ives, Cornwall, April 6.

To the Editors.

Gentlemen,—I must say that I have been keenly interested in the varied correspondence regarding that nuisance known as "blisters." Little doubt exists in my mind that you have "hit the nail on the head" when you remark in your current issue that "the hardness or softness of the wash water is a very material factor in the blistering of the prints." The fact must also be admitted, however, that the hardness or softness of the developing solution must be given a premier claim for consideration. That all papers and cards are not similarly liable to blistering is feasable. Those who do use a paper or card that is addicted to this vexing annoyance must either change the printing stock, or, what is surely more convenient, change the developer.

Many photographers stick to metol or its substitutes as a developing medium, irrespective of any change made in the paper stock. It must be patent to all that the large proportion of soda carbonate which such developers contain has a persistent softening effect on the gelatine. This is evident by the slimy or "soapy" coating it imparts to the fingers and surface of the cards when working with it. The obvious remedy is to use a developer that has no soda carbonate in its formula. I have found no better developer than amidol for avoiding these blisters.

It is quite possible that blisters lurk in the paper-base, or in many cases the fault may lie in the gelatine failing to adhere properly in tiny parts. Nevertheless, it has occurred to me that very minute airbells in the gelatine itself may be a fruitful source of blisters when the paper is treated in soft water. This cause will undoubtedly be aggravated by using a soft-working developer. In any case, in view of the fact that we are now working with an obviously inferior stock, added to the knowledge that we will in all probability be forced to put up with much worse, I would suggest that, no matter what paper or developer is used, prevention is much easier and more satisfactory than the cure. Make the hypo bath acid with metabisulphite, dissolve and add about ½ an ounce of chrome alum to the solution, and the blister trouble, if it does not entirely disappear, will be greatly reduced.

MORRIS LEVY.

9, Dunmore Street, Glasgow, March 6.

OLD PHOTOGRAPHIC LITERATURE.

To the Editors.

Gentlemen,—As a collector of old photographic literature for the purposes of study, rather than speculation, the article by "Bibliophile" in the "B.J." of March 1 was of great interest to me.

First, I must re-echo the sentiments of that writer with regard to the "British Journal of Photography"; it is the only photographic trade journal in the English language which the student of the technical side of photography can turn to with any lasting degree of satisfaction, and in the United States to-day there is not one photographic periodical wherein a scientific article pertaining to photographic theory or practice can be presented to advantage. This is no reflection on American photographic editors, but rather upon the unanimous policy of the American photographic press to exalt the psychic mysteries of "fuzzytype" in preference to the fundamentals of the photographic process. There is no rancour in this statement, as I have had no dealings with the American editors of photographic periodicals; I merely judge them by their respective publications.

On the score of old classics in English photographic literature there are many works which could not be enumerated within the limits of a single article, but I would like to draw attention to a few not mentioned by "Bibliophile" which can still be read with interest and profit.

First there is Robert Hunt's "Popular Treatise on the Art of Photography," Glasgow, 1841. This deserves mention as being the first treatise on photography to be published in English, although papers on the subject by Herschel and Talbot had, of course, appeared in the philosophical Transactions at an earlier date. Most experimenters in colour photography of the present day would doubtless be surprised to encounter Hunt's speculations "On the Possibility of Producing Photographs in their Natural Colours," which are to be found on pages 82 *et seq.* of this early treatise.

Another standby of the photographers of the preceding generation was "A Dictionary of Photography," 2nd Edition, by Thomas Sutton and Geo. Dawson. By reason of the contributions on optics by T. Sutton, this work can share with another, subsequently to be mentioned, the claim to being the first work on photographic optics. As an illustration of the importance to experimenters of reviewing the early literature on their particular subject of investigation take, for instance, the article "Lens" in the Sutton and Dawson "Dictionary." There, among other types, is given an exposition of the properties of the deep meniscus with a front stop placed at the mean centre of curvature of the two surfaces. Dr. Lindsay Johnson thought he "discovered" this in recent times, as is evidenced by his remarks in his "Photographic Optics and Colour Photography," 1909. Neither Sutton nor Johnson, however, discovered that a deep meniscus of finite thickness was capable of satisfying the Petzval condition, as was demonstrated by Von Hoegh in 1900, the ultimate result of his researches being the Hypergon wide-angle lens.

In 1845 there was published a treatise on Optical Drawing Instruments which I have not been able to examine, but, this excepted, the earliest treatise on the optics of photography appears to be that delightful little work on "Photographic Optics" by Desiré C. Van Monckhoven, the English translation of which was published in London in 1867. This heads the list of works on photographic optics in the catalogue of the Patent Office Library, and I believe can be called the first treatise entirely devoted to that subject, although it shares the distinction, to some extent with the Sutton and Dawson "Dictionary." The name of the translator is not given in the English edition of Monckhoven's "Optics," but I have it on good authority that the translation was the work of Mr. Geo. Dawson, who collaborated with Sutton on the previously mentioned work. With the exception of Von Rohr's work, I doubt if there is any other on photographic optics which is as interesting as Monckhoven's, and he certainly originated the idea of accompanying the description of a photographic objective by an accurate list of its optical constants. Although the explanation of some of the aberrations is incomplete, or incorrect, from the modern standpoint, it is, nevertheless, to be noted that Monckhoven, in his mathematical treatment, employs equations derived from Coddington, and it is well known that the English opticians still cling to the Coddington equations, because they represent with accuracy the properties of images.

Trusting that we may in time hear from other readers who like to delve into early photographic literature, I am, yours faithfully,

ALFRED S. CORY,

Technical Editor, "Motion Picture News."

729, Seventh Avenue, New York, March 18.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

M. C.—You can obtain the thin sheet celluloid from Messrs. Rheinlander and Son, Rodney Road, New Malden, Surrey.

G. S.—For instruction in X-ray operating you should apply to the School of Photography, Regent Street, Polytechnic, London, W.1.

FERROTYPE WORKER.—We are unable to tell you formula by which the emulsion was made. We believe most of the plates came from America, hence the shortage. Possibly you could use the wet collodion process, which is still worked in this branch.

H. W.—There is a scarcity of these plates at the present time, since they came largely from America. About the best firm to try for them is Messrs. J. Fallowfield, 146, Charing Cross Road, London, W.C.2. There is no book on the manufacture of the plates or developer. As you will have noticed, we gave a formula recently which has been recommended for making the combined developing and fixing solution.

F. E.—We are afraid there is nothing that can be depended upon to remove ink stains from engravings. We believe professional restorers use a solution of bleaching powder to which a few drops of acid have been added, or a weak solution of chlorine water obtainable from large chemists, but both of these are very risky things, and may easily damage the impression on the engraving or the substance of the paper itself.

F. W.—The brown stains have every appearance of incomplete fixation of the card, and for that there is no remedy in the way of a stain remover. Many of the cards now being supplied require much more thorough fixation than formerly. You should pass them through two fixing baths in succession, and it is well not to let any white light come to them until they have had a short washing after the second fixing bath.

E. G.—The f/7.2 anastigmat was introduced by Zeiss in 1890, and withdrawn by them in 1896. It was made under licence by Ross, but we do not know at what date Ross withdrew it. Your lens of 12⅜ in. focus was listed by both Ross and Zeiss at £12 to cover 9½ × 7 plate. Certainly a "Unar" would be a faster lens, and one of 12 in. ought to cover a whole-plate satisfactorily, but, as you know, these larger apertured lenses are now commanding a much better price.

Xx.—1. Not without pins on a lino-faced easel. The hinged glass front is a different method. 2. We have not latest lists. Why should you not find this out for yourself from the Autotype Company. 3. No. We should say most of them have been destroyed by now. 4. Where speed of working is any consideration, yes. 5. Looks as though the spring had weakened. 6. Not for practical purposes within ordinary limits of exposure. 7. About half or third list price. Doubtful if oil lamp could be used.

SULPHIDE TEST.—Will you kindly inform me what is the sulphide test for hypo baths?—VASCO.

If you mean for estimating the quantity of dissolved silver, it consists in adding sulphide solution to a small quantity of the bath (diluted to a standard bulk), and matching the dark tint with another produced by adding sulphide to an equal bulk of solution containing a known quantity of silver. Reliable (approximately) only with plain, i.e., non-acid, baths which have been quite recently used.

F. W.—Without seeing the lens we should say it is a very old pattern, since it was only the very early lenses which were issued without a slot for a set of diaphragms. You could get the lens tube slotted to take a diaphragm of the Waterhouse pattern, but, failing that, you could perhaps fit a metal or card diaphragm in the lens tube with a couple of spring rims. A mid position is better than either in front or behind the lens, as either of these positions is liable to cut down the field of illumination if the stop is small; but you can fit a medium stop in the lens-hood. The Darlots were good portrait lenses in their day.

DICHROIC FOG.—Will you be good enough to enlighten me as to cause and remedy of the surface stain? Method adopted: Tank development freshly made each time, and fixed in the usual way; tank, etc., always used clean.—M. B.

This is a dichroic fog which may have been produced by traces of ammonia or of hypo in the developer, but more probably by gas or sulphide fumes upon the plate afterwards. It is purely superficial, and rubs off easily with soft indiarubber, but we would suggest Baskett's Globe Polish reducer as the best remedy. Rub the negatives lightly all over, and the fog should speedily disappear.

B. L.—The fixing bath you give is reasonably all right for the great majority of gaslight cards. Personally, we prefer to use metabisulphite instead of bisulphite, taking about half an ounce to every four ounces of hypo. Impossible to say how many cards twenty ounces of your bath will fix. The best plan is to keep some strips of undeveloped dry-plates for testing the degree of exhaustion of the bath. As soon as the bath takes longer than ten minutes to clear the emulsion from the test strip, it had better be discarded, or, at any rate, used as a second bath after cards have had a first fixing in one which has been less used. The trade firms have no special methods of fixing big batches of cards beyond keeping cards constantly on the move in the fixing baths, and, in many cases, passing cards through two fixing baths in succession on the basis just described.

The British Journal of Photography.

Net Prepaid Line Advertisements.

Tariff of Charges.

18 words or less	1/-
Extra words. For every three words or less, ...	2d.

(No reduction for a series.)

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

Special Note. Adv'ts. under a Box Number.

For words "Box No." and office address in adv't. add 4d. per insertion.
For forwarding replies ... ... 6d. per insertion for each adv't.
If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts. should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

Cheques and Postal Orders should be crossed "______ & Co.," and made payable to HENRY GREENWOOD & CO., LTD.

DEPOSIT SYSTEM.—When selling goods to strangers, or purchasing, all risk is avoided by employing our deposit system. Cost is trifling. The purchase-money must be deposited with the publishers, HENRY GREENWOOD & CO., LTD., 24, Wellington Street, W.C. 2, and all Cheques, Money Orders, &c., made payable to them. Acknowledgment is sent to both parties and deposit is held until receipt of advice that goods have been received and found satisfactory, in which case the amount deposited is forwarded to the seller, less a commission of 2½ per cent. (minimum, one shilling; maximum two shillings and sixpence). If goods are not approved the publishers wait original owner's acknowledgment of their safe return before refunding the deposit. In this case the minimum commission only (one shilling) is deducted. All disputes or questions arising from such causes as damage of goods in transit, &c., must be settled between the contracting parties. The deposit is held by Messrs. Greenwood pending settlement. Messrs. Greenwood do not undertake to express any opinion on the condition or value of goods, nor must the goods be sent to them.

⁂ To prevent delay communications relating to Advertisements and general business affairs should be addressed to the publishers. All advertisements are received subject to their approval or revision, and the right is reserved to refuse any advertisement without giving a reason for so doing. The publishers are not responsible for clerical or printers' errors, but every care is taken to prevent mistakes.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 3024. Vol. LXV. FRIDAY, APRIL 19, 1918. Price Twopence.

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SUMMARY

The Man Power Act, which within the next few days is assured of receiving the Royal assent, is still not very fully defined as regards the effect of certain of its provisions, but it seems probable that, in respect to men who come freshly in the category for military service but are of grade III. medical classification, some considerable time is likely to elapse before they will be removed from civilian life. Nevertheless, precautionary measures in the way of training existing staffs are to be recommended to photographers. We deal with these and other points arising out of the situation created by the Act in a leading article on page 178.

Goodwill in the photographic portrait business is a most variable asset. It may be nil, or on the other hand it may derive a very considerable value not only from the previous proprietor's personal skill in photography but from his social connections in the town. (P. 177.)

A photographer who last week was summoned to take a photograph in the Royal Albert Docks was stopped on leaving and subsequently charged with using his apparatus without the permission of the competent military authority. (P. 186.)

Mr. John A. Tennant, in a recent talk with photographers in the "Photographic Journal of America," has some seasonable advice to give on the display of window specimens. (P. 182.)

We demur to the recent suggestion of a correspondent that vulcanite is the best material for tanks used for developing, fixing, etc. For developing, at any rate, a non-oxidisable metal such as platinoid much more nearly fulfils the ideal requirements. (P. 178.)

A number of practical hints on the use of new British dyes for the tinting of photographs are contained in a contribution to "Assistants' Notes." (P. 183.)

A recent paper by members of the staff of the Eastman Research Laboratory deals with the classification of intensifiers, with the aim of providing a numerical measure of the intensifying action of the intensifiers in common use. (P. 179.)

An American worker has recently recommended a hypo-bichromate mixture for the reduction of P.O.P. prints. In our experience a ferricyanide-sulphocyanide mixture is a much better formula. (P. [illegible])

Lenses for soft focus work vary considerably in the optical quality by which the diffusion of definition is obtained, and these differences require to be considered and borne in mind in order to obtain in the negative the effect which is seen upon the focussing screen. (P. [illegible])

[illegible] to photographic goods for Switzerland and the United States. (P. [illegible])

EX CATHEDRA.

Line Advts. to Cost More. We desire to draw prominently to the notice of senders of line advertisements the announcement by our publishers on another page that an increase in the scale of charges has been imposed upon them by recent and very great advances in the prices of paper and printing. Almost exactly two years ago a slight advance was made in the rates for the insertion of these line advertisements, not only as a partial set-off against increased prices, but as a means of economising paper by reducing the volume of these announcements. That object has been in measure attained, and we have no doubt that the introduction of the further advance which our publishers feel themselves compelled to make will tend in the direction of still further brevity in the announcements of Situations Vacant, etc. The increased tariff comes into operation with the issue of May 3. That for next week's issue will be found on page 188, but inasmuch as our publishers are now compelled to return advertisements which are insufficiently prepaid for remittance to the full amount, we hope that the many users of these advertisement columns will bear in mind the date of the new scale, and will save themselves the annoyance of delay in the publication of their announcements.

* * *

The Value of Goodwill. When selling or transferring a business it is usual to place a certain value on goodwill—that is to say, that the connection with customers is handed over and a guarantee given that no attempt to establish another business in the immediate vicinity will be made. The value of this "goodwill" varies greatly in certain businesses, and it is probably less in photography than in almost any other. A grocer can hand over his business to a newcomer, and the chances are that if the latter continues on the old lines few, if any, of the regular customers will transfer their patronage to another shop. In photography it is quite another matter, unless the business is of a rather low class. If the proprietor of the Alaska Portrait Company sells his business, the takings are not likely to suffer, because no one knows or cares who the proprietor is. There is a paid operator, who may often be changed, and the clientèle is equally evanescent; but in the case of a man who has some note of distinction, either in his person or his work, it is a different matter. We met with a case a little while ago in which the purchaser complained of a falling-off of business, and suggested that the former proprietor had misrepresented his takings. Upon investigation it was found that the original owner was deacon of a chapel, and had formed a connection among people of a like mind with himself, while his successor was, to put it mildly, not religious in his ideas, and altogether lacked the urbanity, not to say unctuousness, of his predecessor. Having in view such cases, it is wise when purchasing to ascertain precisely the proportion of the purchase money to be allocated to goodwill and to be certain that it will be worth that amount to the incomer.

*

Soft-Focus Work. Too many portraitists who have been tempted to attempt soft-focus portraiture have been discouraged by the fuzzy results obtained, and have given up at a very early stage, owing not only to a lack of perseverance, but to a want of knowledge of the properties of their lenses. The essential point to be grasped is that in most soft-focus lenses the effect is obtained by the employment of both spherical and chromatic aberrations; consequently the degree of sharpness in the print will not correspond with that observed upon the focussing screen. As a rule the chromatic aberration is of the "positive" variety, and the point of sharpest definition for the most actinic rays lies appreciably in front of the focal plane of the visual image; or, to give an example, if the eye of a sitter be focussed, taking, say, a four-inch head, the points of sharpest focus in the negative would be a little in front of the tip of the nose, the eye being less sharp than upon the ground glass, while the ears are worse still. If the focus be adjusted upon a printed card held opposite the opening of the ear, the definition falls into its proper planes, and the result is infinitely better. This adjustment is not necessary when using single achromatic lenses, such as the front combination of portrait lenses or old landscape lenses used at full aperture, but these give a different type of diffusion from such as the Bergheim, Portland, or Pulligny lenses, with all of which this correction is necessary.

* * *

Metal for Developing Tanks. The suggestion recently of a correspondent that a substance like vulcanite is necessary for the making of developing tanks is one which we cannot endorse. Vulcanite is really a very unreliable material, liable to break, to bend, and to warp. An ideal material for any developing appliance is the metal known as platinoid, which is said to be German silver with a little tungsten added, or it may be described in greater detail as an alloy of copper, zinc, nickel, and tungsten. Though rather dearer than brass, it is not a very expensive material, or was not before the war, while it has some most valuable properties, chief among these being great stiffness and rigidity, even in moderately thin sheet form (though easy to cut and work), and complete immunity from the action of developers. It should make perfect racks, and would also make perfect tanks, though the latter might be comparatively expensive. A good tank that will last for ever is, however, worth paying for, and our experience of platinoid suggests that nothing better could well be used for both rack and tank. It requires no plating, therefore it cannot be damaged by friction or wear, as a nickel coating can be, and frequently is. It is quite rustless, and therefore another source of trouble to tank users is obviated. At present it is probably unobtainable, but it is distinctly a material to be remembered when better times come.

* * *

Reducing P.O.P. and C.C. Prints. While a great many different methods have been published for reducing negatives, the question of applying such a process to gelatine P.O.P. does not appear to have received much attention. The *Scientific American Supplement* has taken up the subject, and calls attention to what is claimed to be an ideal process of reducing prints which have been toned, fixed, washed and dried in the usual manner, and afterwards found to be too dark. The print is placed direct into the following bath—Water, 100 parts; hypo, 10 parts; and 3 parts of a 1 per cent. solution of potassium bichromate. The print begins to reduce almost at once, and very evenly if attended to and rocked. When reduced sufficiently, the print is well washed. Most of the papers retain their tone when treated in this way, but some are apt to take on a bluish-violet tint. The above method is suitable for all gelatine P.O.P., but for collodion papers the following solution is better, as it penetrates the film more effectively. The over-printed collodion picture should not be toned and fixed before reducing. When taken from the frame it is well washed and placed in the following bath:—Water, 100 parts; hydrochloric acid, 1 part; and just a trace of gold chloride solution. At first the image appears to stain, but in a few minutes the bath acts as a reducer and toner combined; the print is washed, fixed and finished as usual. Some years ago we made trials of a large numbers of reducers for gold-toned P.O.P. prints, including the above bichromate-hypo, and found none better than the ferricyanide-sulphocyanide mixture, which we include among P.O.P. formulæ in the Almanac.

THE MAN-POWER ACT.

In common with most other members of the community, photographers have naturally been watching with very keen interest the steps taken by the Government during the past fortnight in the direction of increasing the fighting strength of the nation. Hitherto the photographic profession has contributed to the forces on a basis which, we should say, ranks equally with that applying to any other profession or business, notwithstanding that in photography businesses depending solely or wholly upon the one-man proprietor are probably more numerous than they are in most other occupations. With the raising of the military age it is inevitable that a still larger number of heads of studios will come within the provisions of the new Act, to say nothing of the previously over-age assistants, many of whom, whose help is now keenly requisitioned, often found themselves in pre-war days debarred from obtaining posts on considerations of age. All of these, we have no doubt whatever, will seek to adjust themselves to the critical circumstances of the time, and will wish to exhibit as great a degree of patriotism as the younger ones have already done. They may, perhaps, even find themselves capable of going the length of overlooking the scandal by which aliens or recently-naturalised foreigners of enemy origin escape the net of conscription and succeed in carrying on profitable businesses at the expense of the patriotic Briton, whose affairs must go to the wall as the military problem becomes more acute. Unfortunately, there still seems no disposition in official quarters to put an end to this grossly unfair feature in the national circumstances, the effect of which is, perhaps, as evident in photography as it is in many other businesses.

At the time of writing the intentions of the Government in regard to men of the new military age are not all clear. The seven per cent. very vaguely cited by the Prime Minister in his first speech has been interpreted in several entirely different ways: in an official note as meaning the proportion of men drawn from those of the new age who would be fit for the most active service; by Sir Auckland Geddes, as meaning the proportion of the new men who would be called up during the next twelve months. In view of such differences, it is impossible to attach any importance to the anticipation of this or that Minister. What does, however, seem pretty clear from the daily debates upon the Bill in the House of Commons and from the speeches of the Director of National Service, is that the great military demand is for men of medical grades I. and II., and that, apparently, men of a lower grade at present exempted, and those called under the new

Act, and likewise found of low physical rank, may very likely remain in their civilian employment for a long time to come. It is pointed out that the Act contains no power to transfer a man from one civilian employment to another, although it is quite conceivable that the tribunals, or whatever authority may administer the provisions of the new Act, are able to exert a considerable—and, we would say, a most desirable—pressure in the direction of drawing men into work of national importance.

But, for the moment, we advise photographers to take no hasty steps in the way of seeking to engage managers or of disposing of businesses. The next few days will render matters clearer by providing the authorised text of the Act, and thus lead to a paraphrasing of it in plainer language than that of the Act itself.

The question of one-man businesses has been discussed by the Shoreditch Tribunal, where a suggestion was made that, in the case of shopkeepers being called up, their businesses should be carried on by a committee who would undertake the purchase of stock, engage and supervise assistants, and generally keep an eye on things. This appears to be a somewhat delicate position in any trade, and calls for a high degree of chivalry on the part of the committee, who, it must be remembered, were formerly competitors of the absent man. In so strongly individualistic an occupation as photography it would be quite impracticable. Taking the experience of the past four years as a guide, it would seem that the best plan is to instal a reliable assistant, preferably a lady, to carry on as nearly as possible on the old lines. In no profession have women proved their capability more conclusively than in photography, and there is little ground for mistrust in this emergency. In many of the cheaper classes of businesses, where the taking of portraits has been very thoroughly reduced to an almost automatic operation, a change such as this resolves itself into very little more than training an intelligent girl in the manipulation of the camera and of any artificial light installation. In businesses which owe their prosperity to a higher grade of work on the part of the operator the problem is obviously a more difficult one, but we have no doubt that many photographers will bear us out in the assertion that, when circumstances have necessitated it, a surprising amount of latent talent has been discovered in assistants, and that a longer or shorter period of training has made it possible to find a substitute for the studio operator. The receptionist, if otherwise qualified for the work, is, by her previous duties, marked for a change of this kind. Her association with the finished work has naturally given her some idea of what posing and lighting should be, and hence it has not been the most difficult of things to make her reasonably competent in the practical work of the studio. Such a change of duties cannot be undertaken at short notice, and photographers who have hitherto not contemplated the necessity of anything of the kind may be counselled to discover for themselves without delay the possibilities which exist among members of their own staff. Retouching and printing, on the other hand, are branches of work for which it is easier to make provision, if necessary, outside the studio by taking advantage of the services of trade houses, many of whom will doubtless be affected by the new Act, yet probably will still surmount these obstacles, as they have those which have steadily presented themselves during the past four years.

One thing is certain, namely, that the military authorities will not regard the portrait photographer as doing work of national importance. His work has a sentimental value, but is no more necessary in such times as these than is the jeweller or florist. He is, however, of considerable value in the Services, between them now by far the largest employers of photographers in the world. Recruiting for the photographic section of the Royal Air Service is still going on, but during the amalgamation of the Royal Flying Corps and the Royal Naval Air Service it is not quite clear as to where to apply for conditions of enlistment. We have ourselves received altogether discrepant replies to enquiries on this point and therefore for the present will content ourselves with saying to readers in London that if application be made to the Royal Air Force Recruiting Depot, the Polytechnic, Regent Street, London, W., all particulars will be furnished as soon as possible. Applicants should give their medical category and state whether they wish to qualify as flying-men or as photographic operators: as a rule men of a lower rating than Grade I. are not accepted for the latter work.

Nothing can exaggerate the serious character of the present situation; we are now fighting for our very existence as an independent nation; and the consequences of defeat are too terrible to contemplate. When England has been in peril before her citizens, under no form of conscription except the pressure of public opinion, abandoned their businesses and pressed forward to repel the invader. We may have to do that again, but there will be less probability of such a contingency if we continue the noble work our sons have begun on foreign soil. Every man who seeks exemption on business grounds is hampering the cause of freedom.

THE SENSITOMETRY OF PHOTOGRAPHIC INTENSIFICATION.

(A Communication from the Research Laboratory of the Eastman Kodak Company to the Royal Photographic Society.)

It is well known that when a negative is intensified the intensified deposit is often of a different colour from that of the original negative, and that this colour affects the printing quality of the intensified negative; in fact, some processes of intensification depend entirely upon a change of the silver to some material having a [illegible] a tint colour. For instance, if a negative is bleached to a silver salt and then treated with sulphide solution, the silver will be converted into silver sulphide and visually will be more transparent than it was before the treatment, but the colour of the silver sulphide deposit will be a brown, having much more opacity for blue light than the silver, and consequently, when printed, the negative will give a more contrasty print.

While intensification has been dealt with in photographic literature from the chemical standpoint, and also in regard to the practical advantages and disadvantages of various methods, very little quantitative work has been done on the effect of the colour of the deposit, the only reference we have been able to find being to the work of L. P. Clerc, who measured the printing quality obtained in negatives intensified with Desalme's copper tin intensifier.[1]

In this paper we give an account of a series of measurements made on the effective printing contrast of negatives intensified by various processes, the intensified negatives ranging from those practically neutral in colour to very highly coloured deposits.

The legitimate function of an intensifier is that of increasing the contrast of a negative, thus acting as a corrective of under-development. Intensification may be necessary from several causes. Owing to an error, a negative may have been simply under-developed, in which case intensification will correct this error, or, again, if a negative is known to be badly over-exposed, then by the use of a strongly restrained developer and short development, an image can be obtained in which the gradation will be approximately correct, but the contrast will be insufficient, and intensification will then give the proper contrast. Some intensifiers may be used on under-exposed negatives to strengthen up weak shadow detail which would otherwise be lost in printing ,and thus make it possible to get a print, though in this case the gradation will be incorrect, and no process of intensification can save a serious under-exposure.

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[1] A bibliography of work on the subject of intensification published during the last seventeen years is appended to this paper.

In this paper we do not deal at all with such questions as the permanency of an intensified image or the suitability of the process for practical work. The ease of operation, uniformity of the action, capacity for repetition or for reduction if too heavy intensification is obtained, being completely ignored. In many cases the distortion of the scale of the negative by intensification is of little consequence, but if truer reproduction of the tones of the subject is desired in the finished print, then the intensifier must be chosen with care, and the results shown in Fig. V. or Table IV. form a useful guide as to the selective action of various intensifiers.

The experimental details of the present work require only brief description. Twenty well-known formulæ were investigated. These are shown in the following table :—

TABLE I.

No.	Bleaching Solution.	Blackening Solution.	Reference.
I.	Mercuric chloride	Ammonia...........	Bleach according to Bennett, blackener according to "B.J. Almanac."
II.	Mercuric chloride	Sodium sulphite	Bleach according to Bennett, blackener according to "B.J. Almanac."
III.	Mercuric chloride	Paraminophenol developer	Bleach according to Bennett.
IV.	Mercuric chloride	Schlippe's salt	Bleach according to Bennett, blackener according to "B.J. Almanac."
V.	Mercuric chloride	Ferrous oxalate......	Bleach according to Bennett, blackener according to "B.J. Almanac."
VI.	Potassium bichromate-hydrochloric acid	Amidol developer....	C. Welborne Piper, "B.J. Almanac."
VII.	Mercuric bromide	Amidol developer....	Mercuric bromide solution (Monckhoven Soln. A.) from "B.J. Almanac."
VIII.	Mercuric bromide	Silver cyanide	Monckhoven, "B.J. Almanac."
IX.	Mercuric bromide	Sodium sulphite	Both from Bennett.
X.	Mercuric iodide..........	Paraminophenol developer	Mercuric iodide according to Bennett.
XI.	Acid silver formula in "B.J." Almanac"		
XII.	Uranium formula in "B.J." Almanac"		
XIII.	Lead ferricyanide........	Sodium sulphide	"B.J. Almanac."
XV.	Mercuric iodide..........	Ammonia	Bennett.
XVI.	Mercuric iodide..........	Schlippe's salt	Debenham, "B.J.," 1917, p. 186.
XVII.	Potassium ferricyanide.. + potassium bromide	Sodium sulphide	Ordinary sepia redeveloper.
XVIII.	Cupric chloride..........	Sodium stannite	Desalme, "B.J.," 1912, p. 215.
XIX.	Potassium permanganate hydrochloric acid	Caustic hydrochinon.	Baker, "B.J.," 1906, p. 264.
XX.	Potassium permanganate hydrochloric acid	Sodium stannite	

NOTE.—The references above to the "B.J." and the "B.J. Almanac" are to the "British Journal of Photography" and the annual almanac of the same.

A standard Seed 23 emulsion coated on patent plate-glass was used. Exposures over a range of 1 : 1,000 were made on a non-intermittent sensitometer, and all the plates were developed at 20° C. in a thermostat, in a paraminophenol developer. The development was for such a time that the contrast of the plates, measured by reading visually the densities on a Koenig-Martens photometer, was 0.5. The characteristic curve of the original negatives was determined from a number of plates, and the separate individuals did not differ appreciably from the mean. In all cases the plates were soaked prior to intensification, which was then carried out in duplicate in the various solutions at 20° C. The visual densities were again read, and the curves of the intensified negatives plotted. In the case of highly coloured images, as, for instance, the uranium deposit, the visual densities were determined by the mean of the readings through complementary red and green filters, in order to obviate the difficulty of making an intensity match with photometer fields of different colour.

Ten of the methods were then chosen as being more or less typical, and the photographic effect of these intensifiers was studied by the method now described in detail. For this purpose prints were made on a standard material, both from the original and the intensified negatives. The light-source was a 10-watt tungsten lamp at 110 volts, the illumination falling on the plates was measured by means of a Macbeth illuminometer, and the length of the exposure noted. The times of exposure were such as to just print through some pair of densities on the intensified and original negatives which had received identical exposures in the sensitometer. This fulfils the condition met in practice where prints are made to be comparable by just printing through the same part of the negative (as, for instance, the highest light in the subject), in the case of both the original and intensified negatives. The printing material used was Eastman motion picture positive film. Its characteristic curve was determined by exposing it in a non-intermittent sensitometer to the same light-source mentioned above and measuring the illumination as before. This curve represents the mean of five strips. The development of all the prints and sensitometric strips was carried out in the same solution, for the same length of time, at the standard temperature of 20° C. in the thermostat. All these were then read on the photometer as usual, giving us all the data necessary for the study of the photographic effect of intensifiers—namely, (1) the visual densities of the original negative; (2) the visual readings of the intensified negatives; (3) the same for the reproduction (i.e., the prints of the positive film) from the original; (4) those for the reproduction from the intensified negatives; and (5) the characteristic curve of the printing material (positive film). We have, further, the measurements of the actual exposure in candle-meter-seconds, step for step, in the last three cases.

The Visual Effect.

A non-selective photographic deposit is seldom met with, although certain developers give negatives which approach it. If we assume the original negative to be neutral and the deposit given by the intensifier not to alter the colour, then any increase in the visual density will be a direct measure of the photographic effect. Since in most cases neither of these conditions is fulfilled, the visual data are of little practical importance. However, since authors have previously used this method of presenting the facts, especially of depicting the changes in the characteristic curve of the plate, we also include such curves. Fig. I. shows the effect on the visual plate curve when using, on Seed 23, the various intensifying solutions indicated.

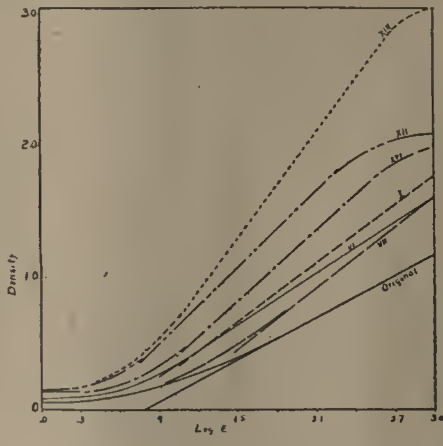

Fig. 1.

We have also plotted the percentage increase in visual density against the original density of the plate. As before, this represents the actual photographic effect only in the case of neutral deposits. This is approximately the case with the mercury intensifiers, with the exception of those blackened in Schlippe's Salt. The data calculated by such methods for a few representative intensifiers are shown graphically in Fig. II.

The horizontal scale in the above figure represents the actual visual densities of the original plate before intensification. The vertical scale shows the percentage increase in these densities by the different intensifiers. The vertical lines on the density scale indicate the log E scale—i.e., the densities corresponding to exposures increasing geometrically by the factor 2

The Photographic Effect.

In presenting a method for the study of the effect it is necessary that the reader fully comprehends the conceptions introduced in the preceding paper by Jones and Wilsey. Since we are dealing with a special phase of the subject of reproduction, especially that concerning the photographic effect of coloured deposits given by some intensifiers, we will further illustrate and explain these terms, applying them entirely to the case of intensification.

Suppose we have a sensitometric strip whose visual densities plotted against log E gives the curve O_v in Fig. III. *a*. This plate is now intensified in a solution which gives a deposit having selective transmission—i.e., photographically speaking, "coloured"). The visual density curve of the intensified plate may be represented by i_v. But now, owing to the colour of the deposit and the fact that such deposits may pass either more or less actinic light than if they were neutral, the actual or effective density of

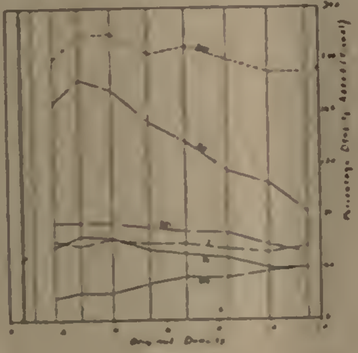

Fig. 2.

some point A on the curve i may be assumed to have some other value such as B. Similarly, all other points on i_v have other values, and form a new curve i_p. This curve then represents the effective printing densities of the plate when used as a negative, and also its effective contrast. For certain well defined conditions of printing the original and intensified plates, such as we have previously mentioned as agreeing with practice, the densities on i_p may be referred to as the photographic densities of the corresponding points on i_v. This should not be confused with the more abstract use of the term by Jones and Wilsey.

Now, if we examine the original plate, whose visual curve is O_v, we may find it to be practically neutral, so that its photographic density curve may coincide with its visual curve. But, on the other hand, if this is not true, then the effective density curve may be represented by O_p, and its photographic contrast will be higher or lower than that measured visually. This is usually the case for even the paraminophenol developer used, although metol and amidol[3] give very nearly neutral deposits.

The problem now before us is to devise a method of obtaining these photographic density curves. The method employed is based on the work done on the theory of reproduction by the authors of the preceding paper.

To aid in a more concrete presentation of this method, graphic curves will be employed. In Fig. III. *a*, *b*, and *c* the curves on III.*a* are those already described. In III.*b* are shown the reproduction curves of the two plates, O_v and i_v, these being plotted in such a way that any print on O_R or i_R represents the deposit given by printing through the corresponding density on O_v or i_v, determined by projection downward from the points on O_R and i_R. Thus the heaviest densities on i_R correspond to the lightest on i_v, i.e., by printing through the latter. Fig. III.*c* is the characteristic curve of the printing medium (positive film), exposed to the same light source as used in producing O_R and i_R. The density scale is the same throughout, and the exposure corresponding to any value of log E in Fig. IIIc is known in candle-metre seconds. Then for any density *x*, produced on positive film by light of the quality transmitted by the negative, we can find the equivalent exposure E_x which produced that density, by reference to the log E axis of the curve M. For example, let us find the equivalent amount of light which the density D_v must have transmitted to produce the density R_i in the print. By projection from R_i to the curve M, and thence to the log E axis, we determine directly this value, E_i, and similarly for any other point on the curve i_v.

Let

D_v = the visual density at any particular step on the original plate.
D_p = the photographic density of the same deposit.
D_v' = the visual density of the intensified plate at the same step,
D_p' = the photographic density of the latter.

The problem is to find D_p', the photographic density of the particular step on the intensified plate, having given the visual density

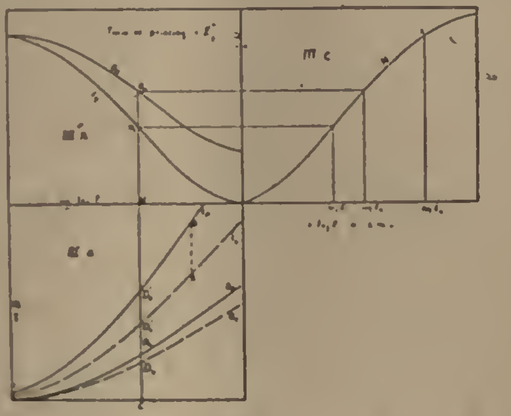

Fig. 3.

of the original negative, the reproductions from the original and intensified negatives, the curve of the reproducing medium developed in the same manner as the reproductions, and the illumination used in making the reproductions and in exposing the sensitometric strips of the medium. That is, we have given in the figure above, O_v, the visual curve of the original negative; O_R, the curve of O_v, printed on the medium; i_R, the curve of the intensified strip printed in the same manner; and M, the characteristic of the printing material. We must also know the exposure in candle-metre seconds incident on the negatives in printing, as well as that given the cine positive in the sensitometer.

Now it will be possible to find the photographic density, D_p', of the point D_v' on the curve i_v. There are two practical methods of solution. The first makes no assumptions as to the selectivity of the deposit on the original, whereas the second assumes that the original negative is neutral, i.e., that $D_v = D_p$.

Method I.

In this method the photographic transmission of the deposit is obtained by measuring the ratio of the equivalent of light passed by the given deposit to the total amount incident upon it. As already shown, the equivalent amount of light actually passed by D_v' is determined by the projection of the point R_i to the curve M, and thence to the log E axis. This gives E_i (from log E_i), the equivalent amount of light transmitted in candle-metre seconds. The exposure used in printing the negative, E_i', is measured by means of an illuminometer in the ordinary way. The photographic transmission, T_i, equals $\frac{E_i}{E_i'}$. From this relation the density is obtained, since $D = \log\frac{I}{T}$ by definition.

We have now found the photographic density, D_p', and in the same manner the other points of the curve i_p may be determined, which is the effective photographic density curve of the intensified negative. Laborious as this method may seem, the figures on an actual case, given below, will show that it is quite practicable.

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[3] We have found that amidol is capable of giving deposits which are photographically blue, namely, that their opacities to white light measured visually are greater than their opacities to the light which is most active photographically.

TABLE II. $E_{i}' = 4{,}360$ c.m.s.

Step on negative.	D_v	R_i	E_i	$D_p' = \log \frac{E_i'}{E_i}$
1	·23	2·03	300	1·16
2	·25	2·00	285	1·19
3	·40	1·82	200	1·34
4	·58	1·47	104	1·62
5	·76	1·12	58	1·88
6	·94	·79	32	2·13
7	1·12	·50	19	2·36
8	1·30	·28	10	2·64
9	1·48	·14	6·2	2·85
10	1·66	·06	5·1	2·93
11	1·86	·02	5·0	2·94

The values of the visual and photographic densities for the above case may be compared by consulting the second and last columns. The higher values of the photographic densities are in part due to the ultra-violet absorption of the plate-glass support of the negative.

METHOD II.

Assume that D_v and D_p coincide, *i.e.*, the original deposit is neutral. Assume also that the original and intensified plates were printed for the same time. The problem is to find D_p' with reference to D_v.

Let $T\,D_p'$ be the photographic transmission corresponding to the photographic density D_p', and $T\,D_v$ be the photographic transmission of the original density taken, D_v.

Then

$$D_p' - D_v = \log \frac{I}{T\,D_p'} - \log \frac{I}{T\,D_v} = \log \frac{T\,D_v}{T\,D_p'}$$

But $T\,D_v$ and $T\,D_p'$ are in the same ratio as E_o and E_i, the exposures derived from the curve M, since E_o and E_i represent the amounts of light passed by D_v and D_p' respectively. Of these E_o, E_i, and D_v are known, and hence we may say that

$$D_p' - D_v = \log \frac{T\,D_v}{T\,D_p'} = \log \frac{E_o}{E_i} = \log E_o - \log E_i.$$

This difference between the logarithms of E_o and E_i gives us directly the difference in density between D_v and D_p'. Adding this to D_v gives us D_p', the photographic density desired.

Table III. gives the values obtained from one experiment.

TABLE III.

Step on negative.	D_v	Log E_o	Log E_i	Log E_o − log E_i	D_p'
1	·06	2·06	—	—	·06
2	·06	1·98	1·90	·08	·14
3	·11	1·84	1·75	·09	·20
4	·20	1·68	1·55	·13	·33
5	·33	1·50	1·29	·21	·54
6	·50	1·26	1·00	·26	·76
7	·68	1·02	0·72	·30	·98
8	·91	·78	·46	·32	1·23
9	1·14	·54	·16	·38	1·52
10	1·37	·26	—·19	·45	1·82
11	1,60	·04	—·19	·23	1·83

It is obvious that this method cannot be applied in cases where the original and intensified plates differ greatly in density, as it is here required that the printing times be the same, and also that the two negatives be printed equally through some pair of steps, usually the highest density.

We have now all the means for determining the photographic action of different intensifiers, and it is possible to plot for any intensifier the four curves, O_v, O_p, i_v, and i_p.

A. H. NIETZ.
(To be continued.) K. HUSE.

PREPAID LINE ADVERTISEMENTS.—Advances in paper and printing have compelled our publishers to make an increase in the charge for line advertisements, commencing with the issue of May 3. See page 188.

THE WINDOW DISPLAY.

(A note in the "Photographic Journal of America.")

WHY do so many photographers neglect their show windows? During a recent trip covering half-a-dozen small towns between New York and Albany I observed, with no little surprise, that the local photographers in every town visited were altogether unappreciative of the value of their display windows. To be sure, the small town is a dull place in February; but this could not excuse the lack of enterprise exhibited, nor the disordered windows, which impressed one unfavourably in passing their places of business.

It is about time the small town photographer realised that he is behind the age in this detail. The photographer fortunate enough to possess a window of any size fronting on a public street has a means of advertising his business which can hardly be overestimated. By his window he can daily remind his townspeople and visitors of the facilities of the studio, introduce specialties and educate his public to realise how useful photography is in the daily life of the community. In a town with 5,000 inhabitants a display window upon a good thoroughfare should be worth fully one hundred dollars a year as advertising space. I hope to awaken one or two, here and there, to this neglected opportunity.

In New York and all the larger towns, the greater amount of "life" in the streets, and the high rentals demanded for space along the principal thoroughfares, compel the photographer to think how he can best utilise all the space he has for advertising his business. At times this leads to overcrowding in the display window, but, as a rule, the city photographer's window is well arranged to attract the attention of the public. Human nature is the same everywhere, and what is done profitably among a thousand people in one place will prove proportionately profitable among a hundred people in another place. Le me persuade the photographer to try the value of his window space as a business "puller-in" for 1918.

There are so many ways of "dressing" a photographer's window to make it profitable that I hardly know where to begin with suggestions. We will suppose that the month or season of the year is adopted as a motif. March is the month when spring costumes are made and bought. and spring dresses photograph to advantage when new. Why not "dress" the window with an attractive display of portraits of fair women and children in all the glory of spring finery? Your negative stock will supply the specimen prints. The idea could be emphasised by securing a model and the co-operation of the local *modiste* or milliner to make up a set of twelve pictures showing the new spring styles. Announce such a display in the local paper and your window will draw every woman in the township. For such a display the ground on which the pictures are set should be light, but not glaring in colour. Light greys and fawns are the season's most fashionable colours; run your display ground and mounts to harmonise with the suggestion, and the window will be all the more attractive.

Let us take another suggestion. Spring time is a capital time for the introduction of new styles. Among the excuses oftenest offered for neglecting the display window is the one that cabinet pictures are difficult to display because of the monotony of size in arrangement. Why not show a selection of new styles in which the regular cabinet portrait loses its familiar shape and appearance? The simple departure from the "rut" of custom will attract the curious. Make a display of portraits trimmed in odd sizes and shapes and mounted with liberal margins. Show prints in different colours, and educate your public in the variety of effects obtained with this or that colour in mounts or finish. There is room, in such a display, for calling attention to a distinctive style at a higher price than the regular cabinet can bring.

We will suppose that the photographer desires to encourage his business in children's pictures. Why not make a good window display to start the idea working for you? Every gallery should make a show of children's pictures at least once a year, and advertise it in the papers.

March is not only the month of "fashions," it is also the month of the "spring cleaning" in every well-conducted household. This means that the home is being brightened up for the light summer days. No better opportunity could be desired for a window display of new designs in picture-frames. For the ground use a warm maroon canvas, show a good selection of gilt and light wood frames of various sizes, and in the centre of the display place an old time worn enlargement framed years ago, to show the contrast between old styles and new. The display of dainty frames gives an exceptional chance to show your best portrait work to advantage.

The objection may be made that these suggestions involve labour or expense. How can the photographer attract attention to his window with only a frame or two of ordinary work to show?

Finally—it should have been said *first*—see that the window-frames and outside furnishings have a coat of paint, and that the windows are cleaned and polished every day. The dingy and ill-kept appearance of the outside of the average country gallery is, of itself, enough to discourage anyone from approaching the place except when some special interest makes in necessary. Paint is cheap, and it helps wonderfully. Enterprise costs a little more than paint—but it also pays better. Apply a little of both to your window display this spring, and the effect will surprise you.

John A. Tennant.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Colouring Prints and Lantern Slides with Dyes.

Now that British firms are in earnest, producing and improving dyes for artistic purposes, artists should avail themselves of the reliable colours for their particular use. In America dyes are put up in various handy forms, the Velox Transparent Stamps, Aristotints, etc., as water colours, and for those who condemn dyes it may be just as well to remind them that Azo and Alizarin Coal Tar dyes are used in this country as water colours. Prejudice will disappear if artists approach the subject not as one of painting, but rather of the art of staining, with its special advantage for the after process of glazing, celluloid-facing and polishing photographs. Again, artists should look upon it as a conventional transparent method, complete within its limits just as pastel is an opaque medium, also conventional, because oil colours provide the only means of a wide range of transparent and opaque elements with the strength to match nature.

The War Photographs now on exhibition are a revelation to many artists in the skilful use of transparent colour, opaque touches of any kind being wisely avoided. Those who have seen them will have received a valuable lesson how photographs should be treated, and not made to appear what they are not at the expense of detail.

For those who would like to try their hand, dyes are the cheapest and simplest of all mediums to use; no preparation necessary. Photographs for treatment should not be deeply printed or given too warm a tone. They are generally coloured flat on a table, at times held in the hand enabling the washes to run either up or down the print. Hitherto apparently most, if not all, of these dyes were of non-British make, but, as already said, British makers have lately produced dyes which in colour and solubility are most excellently adapted for photographic purposes. Few photographers will need to buy in the pound quantities as sold by manufacturers, but they can conveniently test the new products by taking advantage of the set of packets sold ready for dissolving by Mr. [illegible], of Brockley. I have tried these with great satisfaction, and the following notes apply to them.

The set consists of:—

1	2	3	4	5	6
Black	Blue	Crimson	Scarlet	Yellow	Brown

Unfortunately, the code letters, numbers, and chemical names give no indication of their colour, but the six colours required should be selected as near as possible to blue-black, cyanine blue, carmine, scarlet lake, aureolin, and raw sienna or raw umber.

Other colours are got by mixing, as follows:—

Nos. 2 and 3 purple, 2 and 4 lavender, 2 and 5 green, 4 and 5 orange, 1 and 4 brown, 1 and 6 olive.

Any colour can be produced, the exact tint depending upon the proportions of the two colours. For instance, a variety of browns can be made by combining green and orange for bright browns; orange and purple for warm browns; green and purple for olive browns. With these hints the mixing of tints are best acquired by a few experimental trials.

Nos. 1 to 6 diluted make blue-gray, sky-blue, pink, flesh, and straw tints.

Flesh tints are best made up to suit the subject, as pinky (4), sallow (4 and 5), florid (3 and 6).

If the print is a light one, say a vignetted head, then black is very useful in toning the colours and for tints, as 1 and 3 neutral grey, 1 and 6 green grey for backgrounds.

The advantage of dyes are especially manifest in small work (postcards and miniatures), their wonderful transparency allowing fine detail to show through, whereas some water and oil colours are body colours which hide the details.

For P.O.P. and bromide, damp the photograph all over to enable the first wash to run evenly. For glossy collodion paper rub over with strong gum, and colour into that.

The secret of success in using dyes is to use them weakly, building up the colour required by repeated washes. Use blotting paper if you wish to prevent the dyes acting too quickly; it also obliges the worker to proceed slowly. Give the necessary time; the cost is a fraction of a penny. Should the work affect the gloss when finished, polish with a solution of wax in turpentine.

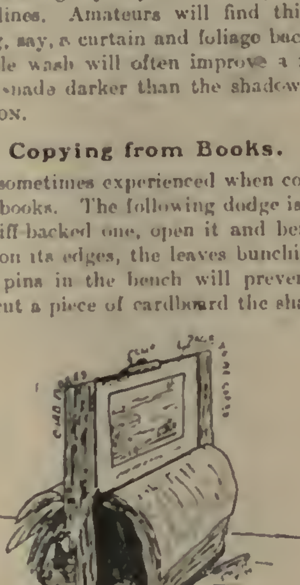
It has been suggested that the scheme of colouring peculiar to Watteau offers advantages for study by the photographic colourist because of its delicacy and freshness of tints.

Dyes are the simplest means of colouring lantern slides (considerable skill is required to use transparent varnish colours), but the work is best done near a tap, as they require to be repeatedly rinsed unless the dyes are applied sufficiently weak and built up carefully. Slides are best held in the hand over white paper. A retouching desk is useful, but as one is always turning the transparency about to guide the running of the washes, it can be dispensed with. Use artificial light, as slides coloured by daylight are apt to be disappointing when thrown on the screen. Here again the use of black, judiciously employed, will give variety to colours and save crudeness of colouring. Blotting paper should not be used.

Attention is called to the hint in the B.J.A. of the use of yellow or orange dye as a convenient blocking out medium when printing on development papers: it is so easy to use owing to its transparency. First go over the film with ox-gall on wet cotton wool; the dye then diffuses slightly beyond the edge of the brush work and avoids harsh lines. Amateurs will find this tip particularly useful in preventing, say, a curtain and foliage background being too evident. Just a pale wash will often improve a negative, enabling dark hair to tell a shade darker than the shadow of the curtain or foliage.—Burlington.

Copying from Books.

Great difficulty is sometimes experienced when copying illustrations or letterpress from books. The following dodge is sometimes useful. If the book is a stiff-backed one, open it and bend the cover back until it will stand on its edges, the leaves bunching out at the top. A couple of push pins in the bench will prevent the book from collapsing. Next cut a piece of cardboard the shape of a square U, the base being as broad as the page to be copied, and two or three inches longer. Hold up the page and place the cardboard behind it, straddling the inverted book. Next clip the top of the page to the card with a small letter-clip and place another clip (preferably a heavier one) on the end of each limb of the cardboard. This will hold the page in a vertical position, and the other leaves being in front and behind, and drooping away from the page wanted, will not interfere with lighting, though the front ones can be covered



with a piece of dark material if unwanted reflection is suspected. In the case of a paper-backed book, the cardboard U can sometimes be used if a stiff book is requisitioned to support the other.—Thermit.

A "Dropping" Cork.

It is not by any means an easy matter to add a solution of potass. bromide to the developer in the form of drops from a bottle containing the usual 10 per cent. solution. "Dropping bottles," so-called, are rather expensive to buy, and the notch cut in a cork favoured by many to facilitate "drops" is hardly to be regarded as a device for the most satisfactory solution of the problem. Some time ago, as the result of a smash, when the commercial dropping bottle was not obtainable, I was led to devise the following very simple home-made accessory :—I first looked up an old fountain-pen filler, the bulb of which was discarded, and carefully cleaned the glass tube from corroded ink. I then selected a well-fitting and sound cork. A hole was then bored through the latter with a gimlet, the glass tube inserted, and the top of the cork was then covered with melted sealing-wax, which held the "dropper" firmly in position. The cork was then inserted in the usual way in the bottle of bromide solution, and it was found, on inverting the bottle, that the solution was emitted in the form of drops, the number required being easily added to the developer. This most handy little fitting has for some time been in constant use in our darkroom.—Expert.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, March 18 to 23 :—

Colour Photography.—No. 5162. Colour photographic process. F. Ganett and W. Friese-Greene.

Film.—No. 4817.—Coating film of celluloid, etc., with sensitized photographic emulsion. N. L. Scott.

Film Drying.—No. 4818.—Aprons of photographic film-drying reels. N. L. Scott.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Era.—No. 381,830. Cinematograph cameras and projectors. Thomas Paget Tomlinson, 18, St. Swithin's Lane, London, E.C.4, manufacturer. February 8, 1918.

Voila.—No. 381,881. Cinematograph cameras and projection apparatus. Thomas Paget Tomlinson, 18, St. Swithin's Lane, London, E.C.4, manufacturer. February 8, 1918.

FORTHCOMING EXHIBITIONS.

April 18 to May.—**Hampshire House, Hammersmith, Photographic Society.** Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12.

Houghton Price Revisions.—Messrs. Houghton, Limited, have just issued a closely printed list, running to 24 pages and itemising numerous price revisions and withdrawals of goods. This list is one which dealers should have, inasmuch as it serves to bring up to date Messrs. Houghton's large general catalogue of 1914.

An Abridged Catalogue has been issued by Messrs. W. Butcher and Sons, Ltd., Camera House, Farringdon Avenue, London, E.C., cataloguing the chief photographic requisites in the way of hand and stand cameras, enlargers, mounts, albums, and miscellaneous accessories in very great number. A sixteen-page inset gives particulars of advances in prices over those contained in Messrs. Butcher's large catalogue of 1914. Dealers will find this supplementary list of service to them.

New Books.

The A.B.C. Guide to Autotype Printing. London : The Autotype Company. 1s. 8d., post free.

The carbon process can have no better manual of instruction than this concise and exceedingly practical text-book, which represents the experience of the Autotype Company, the originators of carbon printing, during nearly fifty years. In dealing with a process which is so essentially different from any other photographic method it is easy to make the mistake of leaving the tyro in doubt by saying too little and equally to confuse him by saying too much. Therefore a quality of this instructive manual which we must especially signalise is its very clear, yet brief, explanation of the stages through which a carbon print passes from the negative to the mount. Essential operations such as sensitising the tissue and squeegeeing to the transfer paper are illustrated by photographs, which usefully supplement the instructions for these parts of the manipulation, which are perhaps the two chief items in which beginners experience difficulty. Old as the carbon process is, it has not stood still, and both the amateur and professional worker will find in this manual methods which further contribute to the ease of the process; for example, the use of a spirit sensitiser dispensing with the trouble and risk in drying the tissue and the use of tanks for the development of prints on rigid temporary supports. Without a rival among photographic printing processes for variety of effect by the one series of operations, the carbon process must always hold a premier place, and in these days, when the absolute permanence of the many prints which are being made for memorial purposes is a matter of the first consideration, is doubly assured of a still larger measure of appreciation than it has secured among photographers generally in the past. Its radical difference from other printing processes is, of course, the greatest obstacle in the way of its wide application, and on that account the clear, practical and authoritative instruction in the present manual gives to the latter an importance which attaches to few text-books of photography.

How to Develop the Negative.—The issue of our contemporary the "Photo-Miniature," recently mentioned in these pages as dealing comprehensively with newly-introduced developers, has been followed by a succeeding number which is a supplement to the former in the sense of dealing in an equally wide manner with practical methods of developing, both new and old, and in reference to developers which have recently come into use. It is a little manual of instruction which will be welcomed equally by professional and amateur workers. By the former, since a large part of it is devoted to methods of tank development, and includes numerous formulæ and tables for development wholly by time (with regard to temperature) or by the "open tank" system, according to which plates are handled in bulk in an open tank and their development controlled in a measure by inspection of them at the latter part of the process. Next follow some useful notes on the working of the Watkins factorial system, and then a selection of systems of tentative development of batches of plates the degree of exposure of which may vary considerably. In this section formulæ and directions for dealing in quantity with plates which have received unknown exposures are given by Mr. A. J. Jarman, who advocates a particular pyro formula for this purpose. Altogether a little manual, though containing much, which will be assured of a welcome by practical photographers. It cannot now be bought in this country, but is obtainable from Messrs. Tennant and Ward, 103, Park Avenue, New York, on remittance of 12 British penny stamps or international post office coupons to the value of twenty-five cents.

Reckoning Line Advertisements.—In reference to the increased scale of charges for prepaid line advertisements, which is notified on page 177, this week's "B.J." contains a schedule by which announcements can be priced correctly to 1d., and delay in publication from insufficient remittance avoided. Receptionists and others should note this table and keep it by them.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

TUESDAY, APRIL 23.

Birmingham Photographic Society. "Photography and Focus" Prize Slides.

Manchester Amateur Photographic Society. "A Chat About Press Photography." J. Waterall.

WEDNESDAY, APRIL 24.

Croydon Camera Club. Display of Prints from Negatives taken on the Easter Monday outing.

Ilford Photographic Society. General Meeting.

THURSDAY, APRIL 25.

Stockport Photographic Society. "Transferrotype." S. B. Hooley.

Hammersmith (Hampshire House) Photographic Society. Members Lecturette Competition, etc., Lantern Slides, and Outing Prints.

ROYAL PHOTOGRAPHIC SOCIETY.

MEETING held Tuesday, April 16, Mr. F. F. Renwick in the chair.

A paper, announced as "The Structure of the Photographic Image," was read by Mr. F. Krohn, whose communication, however, proved to be one dealing less with the physical structure of developed plates than with the whole complex question of variations in the determination of the speed and density curves of plates. The lecturer chiefly described experiments in support of the view that apparently different values for the inertia were obtained with different times of development, that is to say, for different values of development factor. His opinion was that plates which did not show this variation were the exception, and were also, as a rule, those of not particularly good quality in the matter of freedom from fog. His evidence of this connection and of that with concentration of the developer was contained in the numerous curves and tables accompanying the paper. The respect in which his paper justified its title was in the view he expressed, with some diffidence, however, that in the case of plates of long density curves it was possible to detect with an oil-immersion microscope a similar [illegible] crystalline structure. He admitted that such observation was exceedingly difficult, but there was enough to suggest that the correspondence was not accidental. At the close of a lengthy paper loaded with experimental data he urged upon the Society the importance of securing some standardisation of the conditions under which speed determinations on the H. and D. system were carried out. Without such common adoption the speed numbers were quite misleading. While recommending this course he took occasion to justify the preference of the user of plates of departing from the strict method of Hurter and Driffield in deriving the speed number only from the straight line portion of the density curve.

The paper came under some discussion by Mr. O. Bloch and the Chairman, and on the proposition of the latter the hearty thanks of the meeting were accorded to Mr. Krohn.

RÖNTGEN SOCIETY.

AT the meeting of the Röntgen Society, held on Tuesday, April 9, with Captain G. W. C. Kaye, President, in the chair, Professor Sir Ernest Rutherford delivered the first Silvanus Thompson Memorial Lecture. He dealt with the important advances in our knowledge of the constitution of matter, resulting from the discovery of X rays in 1895. The following brief abstract indicates the scope of the address.

The discovery of the X rays marks the commencement of a new epoch in physical science, for in the attempts which were immediately made to ascertain the nature of the unknown radiation attention was directed to the study of radiation in general, and new phenomena were soon encountered.

A general investigation of the cathode rays, and of the nature of the discharge of electricity through gases, led to the discovery of the "electron," and to the putting forward of the "ionisation theory" by Sir J. J. Thomson. Townsend followed up the initial work by his theory of ionisation by collision, and O. W. Richardson investigated the emission of ions from incandescent solids. All this work was originally of academic interest solely, but within the last few years the practical applications have been shown to possess immense value. These include the production of detectors and amplifiers for wireless telegraphy, electrical rectifiers and oscillators, by which radio-telephony across the Atlantic is now possible, and the Coolidge X-ray tube, which is destined to play an important part in radiology and in pure science. From the outset X-rays and the phenomena of phosphorescence were generally thought to be connected, and Becquerel, while in search of "invisible" or X-radiations from certain phosphorescent salts, discovered the radio-activity of uranium compounds. The brilliant researches of the Curies, by which this discovery was followed, resulted in the isolation of the radio-active elements, polonium and radium. Numerous other radio-active elements were brought to light, and the chaotic condition which ensued was not reduced to order until the introduction of the transformation theory by Sir E. Rutherford. Difficulties regarding the periodic classification of the chemical elements were overcome by Soddy, who applied the term "isotope" to substances occupying the same place in the periodic table, which cannot be separated chemically, but whose atomic weights may differ slightly.

With regard to the study of X-rays themselves, no outstanding advances were made for some ten years after their discovery, when Barkla obtained evidence of the existence of "characteristic" radiations from experiments on secondary X-rays. The discovery led to the wave-theory of the X-rays, which was completely substantiated at later dates by the diffraction experiments of Laue, the Braggs, Moseley, and Darwin. Barkla's characteristic rays are thus shown to be of the same nature as the rays yielding bright line spectra in the case of ordinary light. The diffraction experiments led to the employment of the X-rays for two classes of investigation: in the hands of Professor Bragg and his son, problems of crystal structure have been successfully attacked; while in the other direction the late Mr. Moseley has shown these phenomena to be a most powerful method of investigating the constitution of the elements. He showed that the critical property of an element was its atomic *number*, while its atomic weight was relatively of secondary importance. The important relationship between the frequency of the K or L series of characteristic rays and the atomic number of the elements should be known as Moseley's law.

At the conclusion of the meeting the President presented to Sir Ernest Rutherford the first of the medals which will be given annually in commemoration of the Silvanus Thompson Memorial Lecture.

Commercial & Legal Intelligence.

WILLIAM JOHN WETTEL, picture framer and photograph enlarger, residing and carrying on business at 51, Musgrave Street, West Hartlepool, has been adjudicated bankrupt. The receiving order was made on April 10, on the debtor's petition.

THE PUBLIC EXAMINATION of H. A. J. Heathcote, lately photographer, 22, St. James's Street, S.W., was held on April 12 before Mr. Registrar Franckes at the London Bankruptcy Court. The accounts showed liabilities £725 15s. 8d. and assets, "reversionary interest under the will of a relative, £2,000."—Questioned by Mr. F. T. Garton, Official Receiver, the debtor stated that for several years prior to the outbreak of the war he was engaged as an artist; he then obtained a commission in the Royal Naval Volunteer Reserve, but was invalided out in January, 1916. In the following March he raised £2,000 on his reversionary interest under the will of his great-grandfather, and in August, 1916, having raised a further £1,900 on the same interest, he opened a studio at 22, St. James's Street, where he started the business of a photographer, under the style of Arthur Heathcote. During the previous April he registered "Arthur Heathcote, Limited," with a nominal capital of £500, but beyond the mere registration nothing was done in the matter; the liabilities of the photographic business were contracted in witness's own name, and the company was never moribund. Owing to ill-health and heavy expenses in conducting the business it was a failure throughout, and was closed in August, 1917, since which date he had been without occupation. Witness attributed his failure—not his insolvency, because he was more than solvent—to the loss on the business. The only books of account kept were a card index and a diary. Asked regarding his reversionary interest, the debtor said his great-grandfather left £200,000 in trust. The present life-tenant was his cousin; the life interest went next to his father, and then came to witness as the eldest son. By a family arrangement he had sold his expectation to £100,000 for about £4,000 and the remainder for £2,000, which he returned as his only asset. The examination was concluded.

News and Notes.

Optical Text Books.—Messrs. Blackie and Sons, Limited, have almost ready for publication an edited translation of the German work by Steinheil and Voit on applied optics, a complete trigonometrical system of optical computation which for many years past has been a standard work among opticians, but has hitherto been available only in German. The English version is the work of Mr. J. W. French, B.Sc.

Russian Platinum.—The current issue of "Russia," a magazine dealing with economic features of the Russian Empire, and published by Messrs. R. Martens and Co., 149, Leadenhall Street, E.C., contains a lengthy statistical article on the platinum resources of Russia. The geographical distribution of platinum is indicated by detail maps, and figures given for the production and price of the raw metal from 1843 to 1915. According to this table 83 per cent. platinum, which in 1858 sold for 12s. per ounce, reached its highest value in 1912, when its price was £7 4s. per ounce.

Photography in London Docks.—At West Ham Police Court on Monday last Samuel Cohen, a photographer, of High Street, Stratford, was summoned for entering a prohibited area and with having in his possession a photographic camera and plates without the consent of the competent military authority. The defendant pleaded "Guilty" to a technical offence.

Inspector Richardson said that on March 30 it was considered necessary to take the photographs of the crew of a vessel in the Royal Albert Docks. The man authorised to do the work failing to put in an appearance, the defendant was sent for and took the photographs. The defendant was stopped when leaving the docks with the camera and plates in his possession.

In answer to Mr. Ratcliffe Cousins, Inspector Richardson said the plates had not been developed. They had no reason to suspect there would be anything other than the photographs of the crew.

Mr. Ratcliffe Cousins: Before I deal with the case the plates must be developed. I want to know what is on them.

The case was then adjourned, and the Clerk of the Court took possession of the plates to have them developed.

Gas Economy.—The recent Order under the Defence of the Realm Act is one which has naturally given rise to a good deal of discussion as to its practicability. The terms of the Order are that it is an offence, punishable with a fine not exceeding £100 or by imprisonment, to consume more than five-sixths of the quantity of gas consumed on the same premises in the corresponding quarter of 1916 or 1917, whichever is the greater. The Order does not apply to cases where the consumption is less than 3,000 cubic feet per quarter in the Midsummer and Michaelmas quarters or 3,500 cubic feet in the Christmas and Lady-Day quarters. Photographers, however, who burn gas in any reasonable quantity either for the heating or lighting of rooms or for photographic operations are not likely to have limited their consumption to a figure which makes them exempt from the Order. Those who within the past two years have exercised economy in the use of gas now find themselves penalised and placed in a position in which it is very likely a matter of utter impossibility to comply with the Order except by dismantling gas-heating appliances in cases where a solid fuel can be used. No doubt some economy can be effected, and it will be well to have weekly readings taken of the meter and properly recorded in order that evidence may be forthcoming of steps having been taken in this direction.

The Carriage of Collodion.—At the Marylebone Police Court recently, Messrs. Penrose and Co., of Farringdon Road, were fined £20, with £2 2s. costs, for sending collodion, a highly inflammable liquid, by the Great Western Railway, without distinctly marking the nature of the goods on the outside of the package, or giving notice of the fact in writing.

Mr. P. W. Pine, prosecuting, said the collodion was packed in two cases, weighing 1½ cwt., and was consigned to Belfast as photo-paint. As a matter of fact, it was impossible to get this stuff to Ireland by ordinary means, as the Belfast Steamship Company refused to carry any explosive or highly inflammable goods by their steamers.

The Magistrate.—You suggest that they disguised what it was in order to get it carried?

Mr. Pine.—Exactly. The result was, he added, that instead of being specially dealt with, it was treated as an ordinary parcel, and while one of the cases was being unloaded in Ireland it fell out of a sling and broke. That was how the offence was brought to light.

Mr. Frampton, counsel for the defence, pleaded guilty, and pointed out that collodion was used in the manufacture of photographic negatives.

The magistrate (Mr. Biron) said it looked to him as if it was done deliberately.

Exports of Photographic Goods.—The current issue of the "Board of Trade Journal" makes reference to two recent orders as to export of photographic goods, in the one case to Switzerland and in the other to the United States. With regard to Switzerland the British Foreign Office has included photographic papers, plates, and films among the goods in respect of which a licence is granted only if the goods are consigned to the Société Suisse de Surveillance Economique (S.S.S.). But they are allowed to benefit under the special system for small parcels, according to which they may be exported from the United Kingdom to Switzerland without an acceptance certificate being previously claimed from the S.S.S. It is, however, necessary to apply for a licence to the War Trade Department, which may, if it thinks fit, ask for the production of a certificate from the S.S.S.

The regulation of photographic goods from Europe for the United States is one of the British War Trade Board at Washington, and stipulates that in the case of goods shipped after April 15 their import into the United States from Europe is prohibited unless they travel as return cargo from ports in Europe, and then only when they are shipped from a convenient port, are loaded without delay, and are not included among the goods the import from Europe of which is specifically prohibited. United States consuls have instructions to see that their certificates are granted only on observance of these conditions.

Matthews' Trade Printing, Etc.—The firm of B. Matthews, 134-140, Idle Road, Bradford, sends us its new list of prices for postcard printing, etc., which took effect at the beginning of the present month. Prices for the black bromide postcards, which we believe are the largest branch of the business, have been advanced to 1s. 6d. per dozen for quantities from 1 dozen to 12 dozen per negative; 2s. for sepia-toned cards. It is satisfactory to learn that, despite the circumstances of the time, Messrs. Matthews have been able to maintain their service at a very high degree of efficiency, a claim which we can entirely accept on the strength of what we know of the extraordinarily perfect organisation of their works. Samples from their current production of bromide cards, matt and glossy, black and sepia, show the very high quality which they maintain for work which is turned out upon an enormous scale and with a very high degree of promptitude. A third edition of the "Anderson Developing Calculator" has been issued, with the revision that it can now be employed not only for the Anderson pyro-soda formula but also for the "B.J." pyro-soda, after slight modification by addition of a little potass bromide. Very likely there are still many photographers developing plates in quantity who are unacquainted with this useful means of introducing system into the developing room. The calculator prescribes factors to be used in developing the brands of plates in ordinary use among professionals, and supplies a means of ascertaining without any arithmetical calculation the time for which a batch of plates must be developed at a given temperature. In these days of utilising in the most efficient way the labour which is available in photographic studios there is good reason for calling attention to the very practical and reliable service which this calculator can render. Its price, post free, is 1s. 2d.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

BLISTERS AND SOFT WATER.

To the Editors.

Gentlemen,—I have been greatly interested in the articles and correspondence dealing with soft water and blisters, though not troubled by soft water myself. Would it be possible to cure the softness of water by adding that which nature has left out? This might be done by hanging at the side of the tap a dripping bottle, containing a solution of one of the calcium salts. Should you consider the idea feasible, perhaps you will add a note to this, re the best salt to use? Not having a soft water supply, I am unable to experiment myself.—Yours sincerely, THERMIT.

[It would be possible to pass water through a container containing calcium sulphate, but in practice the use of a hardening fixing bath fulfils requirements more simply and certainly.—EDS. "B.J."]

OLD PHOTOGRAPHIC LITERATURE.

To the Editors.

Gentlemen,—Your correspondent Mr. Alfred S. Cory, of New York, has touched a most interesting subject. I must say that the old volumes on photography are to me continual sources of information, and the perusal of much of this old literature has been, to me at any rate, productive of much thought and interesting experimental work. In England we have at our disposal some very fine collections of technical books, i.e., at the Patent Office; and so far as photography is concerned, one might mention the magnificent library of photographic works at the Royal Photographic Society's Rooms, available to all members, and to all members of the public who can become members. I don't think these libraries are at all valued or used as they should be. I am at present very deep in experiments with lenses; to list, to examine, and generally try out an old type, after looking up its maker's statements, affords me great pleasure, and also food for thought. Your correspondent refers to Monckhoven's "Photographic Optics," published in 1867, as the first complete treatise devoted to the subject. He may be right, but in 1860 was issued a volume by James Martin, entitled "Photographic Art," in which photographic optics as then known was fully discussed and diagrammed. This volume is a rare one, seldom now met with. It was issued by Richard Griffin and Co., publishers to the University of Glasgow, as one of a number of science books under the heading of "Orr's Circle of the Sciences."—Yours faithfully,

FREDERICK T. CORKETT.

Dorking, April 15.

THE USE OF EXPOSURE METERS.

To the Editors.

Gentlemen,—On opening my "B.J." to-day I noticed with interest the article by Mr. Bitter on the Watkins Bee meter, but was much disappointed with the nature of the "discovery." The instructions show much ingenuity, but are only of use to one who uses the meter improperly. Mr. Bitter has evidently given some attention to Mr. Watkins' writings on the subject, but has missed the main point that Mr. Watkins surely makes perfectly plain, that is, "Test the light that falls on the subject." I quote in support of this opinion from Mr. Bitter's letter, p. 171, near end of col. 2, "No special instructions are given by Mr. Watkins, either in the Manual or the Bee booklet, for such variations of exposure as are made necessary by the direction of the light" etc., etc. Now, if Mr. Watkins' instructions are followed, when an exposure is being made, say, on a line from north to south, whatever the position of the sun the meter will look straight at the camera if placed at the subject, or if not placed at the subject it will be held so as to look along a line parallel with the direction of the camera's view. By so using the meter every difference of light from sun behind object to sun behind camera is automatically allowed for by the Bee meter, or any other actinometer, for that matter.

I use the meter constantly, and find it tells me the truth; it would not do so if I did not use it as above.

Mr. Bitter refers to his having been stung. It is a habit of bees to sting when mishandled or when approached by those who do not understand them.

Instead of censure being passed on this production of Mr. Watkins, praise ought to be given him for the extraordinary advance photography has made through his efforts. If one will use his "Bee" speed-card, time tank, and thermometer there is no mystery in producing good negatives almost right away.—Yours faithfully,

OLIVER HORTON.

199, Buchanan Street, Glasgow, April 13.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

D. C. M.—We have an article on the subject in type to appear shortly.

B. MATTISON.—You are right in point of law, and your customer is wrong. Let him threaten. We are quite sure he will not get a lawyer to advise him to take action.

J. C.—We cannot find such a lens described in any catalogue, but, judging from your description, it would not cover more than a 5 x 4 plate. The original cost was probably about £3.

C. L. F. MAPLES.—Very doubtful if it is worth its price. Few of these secret processes are. If it is for bromide or P.O.P. emulsion we could make a pretty shrewd guess at its source.

J. W.—The lens appears to be an ordinary quarter-plate French portrait lens, of which the value is only a few shillings, say, 7s. 6d. to 10s. You have apparently reversed the position of the combination; the lens with the air-space is the back one.

A. J. F. B.—1. We cannot identify the material you mention. Why not inquire of your local draper? If it is made for window-dressing, Messrs. Potter and Sons, Aldersgate Street, London, E.C., could probably supply it. 2. There is no risk of affecting the permanency of prints by using Mr. Comley's stop bath.

W. T. BLEWITT.—If you take our advice you will have nothing to do with it. The proposition is a very doubtful one indeed at the present time, and we should judge that you would not have the slightest chance of doing business at a profit when prices fall, as they are bound to do after the war, considerably below their present level.

A. G. D.—There is no book on the making of emulsion for negative plates, excepting the large German treatises on the subject, such as you can see in the Patent Office Library, 25, Southampton Buildings, Chancery Lane, London, W.C., daily from 10 to 5.

K. E. F.—We do not think there is anything exceptional in the circumstances. It would seem that the order for the portraits was given in the customary way, and that, therefore, the copyright is the property of the sitter. That being so, you can take no objection to the sitter having the portrait enlarged or copied in any desired way.

B B B.—Quality varies so greatly that it is quite impossible for us to suggest a price when we have no means of guessing what the quality is. A great deal of rubbish is put out in this branch of the trade, and is dear at any price; but if you can supply decent work, and more especially if you can keep promises as regards date of delivery, there is plenty of business to be had.

Messenger.—We think the apparatus to which you refer is that introduced some five or six years ago by Messrs. Walltuch, Smith and Co. At that time enlarging from small negatives was not so widely practised as it now is in the cheap portrait trade, but at the present time the system of making postcard portraits from much smaller negatives is very widely adopted and frequently with comparatively primitive home-made apparatus.

F and Company.—As you surely have seen from letters which have appeared in our correspondence columns within the past week or two, the quality of the tap water, hard or soft, does have a very material effect upon the occurrence or otherwise of blisters on prints in sulphide toning. This action extends to prints which are fixed and washed without toning, but it is more likely to occur after sepia toning, owing to the softening action of the sulphide bath.

Sketch Portraiture.—Would you please let me know if the *light* has to be blocked off between the *sitter* and the *background*, that is to say, after the background has been lit up? Am I to understand that the sitter is placed 6 feet away from the background and that the intervening light is to be blocked off?—John McC.

You are quite right in assuming that the blinds are drawn over the head of the sitter with a gap behind to light up the background.

B. K.—In reply to your queries: (1) The focal length is 6 inches. (2) The largest aperture is f/3. The lens will cover only a carte-de-visite. (3) As you will see from Nos. 1 and 2, the largest aperture must be 2 in. (4) A portrait lens of about the year 1860 or 1861. (5) Its value is about 30s. (6) You would require about four 1,000 c.p. half-watt lamps. (7) You would be very limited as regards what you could do, since the lens will only cover a carte-de-visite plate.

Reflex Mirror.—I have a reflex camera, the mirror of which has recently been re-silvered. I find now on using it that it is difficult to focus sharply on the top screen; and when using a long focus large aperture lens, like a New Large Adon, the distortion is enormous. On stopping down it begins to improve. What is the cause? In my own opinion, it is uneven silvering.—Edward J. Jacobs.

Bad silvering might perhaps account for it, but we think it is more likely to be due to faulty re-setting of the mirror, possibly in the way of straining the glass.

P. G.—The best way is to try what is known as the Spanish windlass, which is capable of unscrewing anything, provided the threads are not actually rusted together. Take a piece of strong cord long enough to wrap three times round the condenser, tie the ends firmly together, and then put round the condenser, passing one end of the double cord through the other. Pull tight and put a stout stick through the loop, so that one end bears against the side of the condenser mount. The stick will then act as a lever, and if long enough will give a purchase that will shift anything. The principle is, of course, that of the chain wrench used by engineers for unscrewing pipes; this you have perhaps seen. Your suggestion for bayonet catches has, we believe, been carried out by some makers, and we agree with you that the old method of screwing is very troublesome.

Studio Sidelight.—We have the opportunity of (otherwise) suitable premises for shop and studio in an excellent position, but there is some difficulty in securing side-light lower down than 6 ft. from the floor. We should be glad of your opinion in regard to the latter difficulty. Would it prove a serious disadvantage in the lighting? The side would face in northerly direction. Of course, we should have preferred the side-light about 18 ins. from the floor. Perhaps you can kindly give us your views, for which we should be greatly obliged.—Lighting.

If the studio is of good width (so that you can place the sitter 8 ft. from the side-light), the 6 ft. wall on the side will not be a material drawback. But with anything short of this in width it will be a serious drawback for single portraits, and in any circumstances is liable to make it awkward to deal with groups of any size.

E J. A.—1. We should recommend you to try to get prints from the negatives as they are, using a "contrasty" bromide or gaslight paper, such as Velox or Wellington S.P. There is always a risk of staining in intensifying. The mercury and ammonia will give the best results. Make a fresh solution of mercury, and use at least 1 drachm of ammonia to 5 ozs. of water; more if you have had the ammonia in stock for long. Wash for about 40 minutes between mercury and ammonia, and 5 minutes final washing. The other intensifiers you mention are good, but the mercury and ammonia is the simplest. Why not reproduce the negatives by making a transparency on a process plate, develop fully, and intensify, and from that another negative also on a process plate? This will give you more density than intensifying the original, and there is no risk. 2. You will deal best with the snow scene by reducing with persulphate of ammonia; this will reduce the highlights before it touches the shadows. It does not matter on what side you work up a negative. Every dark touch on the negative is a light one on the print. 3. You cannot use a stylo for writing on celluloid; a fine sable brush is the proper thing. You can attach the celluloid with Seccotine. 4. About 10 grains resin to the ounce of turpentine. You can use more if you like a thicker medium. Neither methylated spirits nor vinegar can be used. 5. You can make a stop bath by mixing an ounce of acetic acid in 120 ozs. of water, but we think you would do better to use tartaric acid, as recommended by Mr. Comley in the "B.J." of March 1, as the acetic acid may soften the gelatine. There is a great scarcity of acetic acid just now, and almost any chemist would be glad to purchase your stock.

The British Journal of Photography.

IMPORTANT NOTICE.

The tariff below applies only to advertisements for next week's issue, April 26. Commencing with the issue of May 3, an increased scale of charges comes into operation, viz., 1d. a word—minimum, 1s.

Inasmuch as advertisements cannot be inserted unless fully prepaid, advertisers are requested to make a note of the advanced rate.

Net Prepaid Line Advertisements.

Tariff of Charges.

18 words or less	1/-
Extra words. For every three words or less, ...	2d.

(No reduction for a series.)

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

Special Note. Adv'ts under a Box Number.

For words "Box No." and office address in adv't add 4d. per insertion.

For forwarding replies ... ... 6d. per insertion for each adv't.

If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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SUMMARY

Commencing with the issue of next week prepaid line advertisements in the "British Journal" will be charged at the rate of twelve words (or less), 1s.; extra words, 1d. per word. Advertisements cannot be inserted unless fully prepaid, and, therefore, the schedule on page XII of this issue may usefully be kept for reference.

Photographic apparatus, photographs, and enlargements are among the goods which recently have been subjected to a "luxury" tax in France. (P. 189.)

If such goods are to be included in the "luxury" tax contemplated in the present Budget in this country it is to be hoped that apparatus for professional and commercial photography will be exempted. (P. 189.)

The concluding portion of the paper by Messrs. Nietz and Huse on the effective action of intensifiers illustrates in several diagrams the different types of intensifying action, as well as the degree of intensification and of proportional effect, which is produced by different formulæ. (P. 191.)

In a leading article we point out in what way the measurements by Nietz and Huse have a very practical application, namely, in bringing into prominence the chemical stain or developer stain in the negative [illegible] which may give rise to disappointment in the use of an intensifier. (P. 190.)

The names of photographers at the Front figure with distinction in the war news. Mr. Ernest Brooks has been awarded the Croix de Guerre for the [illegible] of [illegible], and Mr. Armand Consolé has been specially mentioned for carrying out his work with great valour during the present offensive by the Germans. (P. 198.)

Much interesting talk on modern developments in pictorial art is reported from a recent lecture on Impressionism at the Croydon Camera Club. (P. 197.)

In the absence of a multiple back, a series of cardboard masks can be readily accommodated for making a number of exposures on a larger plate. (P. 194.)

The licence to the photographer for the use of his camera within the London Docks has been abolished. (P. 198.)

A contributor to "Assistants' Notes" has some good advice to give on the efficient [illegible] of the work in retouching negatives and in finishing prints. (P. 194.)

An attachment for the shutter of photographic apparatus is provided for the need for a rapid printing frame or box, the exposure given by which can be predetermined in advance. (P. 196.)

A [illegible] of the [illegible] in [illegible] weather is the subject of an Assistants' Note. (P. 194.)

EX CATHEDRA.

Prepaid Line Advts. As announced last week, an increased scale of charges for the insertion of prepaid line advertisements has had to be adopted by our publishers as the result of very considerable advances in the charges for paper and printing. Particulars of the new tariff will be found on page 200, from which it will be seen that the cost of an advertisement is very simply reckoned at the rate of one penny a word with a minimum charge of one shilling. What is, however, not quite so simple is the reckoning of the number of "words" in an announcement. Inasmuch as the circumstances of the time have imposed upon our publishers the necessity of withholding publication of these advertisements, unless fully prepaid—for the sake of avoiding a great deal of unnecessary book-keeping—it is a matter of some moment to advertisers that they should be able to reckon the number of words in an announcement, and thus ensure its prompt publication. We, therefore, again reprint among the advertisements of this issue the schedule which we compiled a few weeks ago in the hope that regular or occasional senders of line advertisements will keep it by them, and will recognise its usefulness to them in avoiding the necessity of application being made for a supplementary remittance. The schedule includes all those nondescript signs and symbols on which there may be divided opinions as to their forming one word or two, but advertisers have the advantage that they are able to reckon the number of words in their announcements precisely as does our publishers' staff.

* * *

The Tax on Luxuries. The announcement by the Chancellor of the Exchequer on Monday evening last that his Budget contemplates the imposition of a tax upon articles of luxury on the lines of that recently adopted in France raises the possibility that photographic goods and photographs themselves may have a tax applied to them as has been done by the French Government. According to the French finance law, which came into operation at the end of March, photographic appliances, lenses, and accessories are among the twenty-six classes of articles which bear a 10 per cent. tax irrespective of the price at which they are sold. Photographs and photographic enlargements are included in a much longer list of "luxuries," which are taxed to the same extent only when the retail price exceeds a certain amount. In the case of portrait photographs this is 40 frs. per dozen; in the case of enlargements, it is 40 frs. each. In other words, portrait photographs the price of which is below, say, 30s. per dozen and portrait enlargements which are sold for the same sum each go untaxed, but in the case of these goods which are sold retail at prices above this figure the Republic imposes a tax of 10 per cent on the retail price. No details are, however, forthcoming at the time of writing of the intentions of the Government in respect to the goods which will come within its scope: the amount of the tax is put at 2d. on the shilling.

* * *

Non-Luxury Appliances. If, as is suggested, the proposed tax on luxuries is to be modelled on that in France, it is to be very strongly urged that the schedule published in the current issue of the "Board of Trade Journal," if applied without qualification, will bear very unfairly on individual cases. Photographic appliances are a notable case in point. While apparatus for the practice of photography as a pastime is very properly classed as a luxury, those which a professional photographer buys for the carrying on of his business are in no sense a luxury, and ought not to be subject to taxation. No doubt this is a possible contingency which has the attention of the Professional Photographers' Association, obviously the body which could make the necessary appeal to the Committee which is charged with the business of selecting and classifying goods which may be taxed. Picture frames form another item in the French schedule, according to which they are exempt from tax if costing no more than 10 frs. This seems to be a very reasonable limit. A silver frame for a photograph which costs a couple of guineas is certainly a luxury, whereas a frame for an enlargement for which seven or eight shillings may be charged cannot appropriately be classified as falling in the luxury class of goods.

* * *

Optical Text-Books. We are glad to note that the first step in the direction of making foreign optical text-books available to English readers is being taken by the issue, announced last week, of Steinheil and Voit's work, by Messrs. Blackie. But this is a highly technical work for the professional computer and designer of lenses; others of a more general character are, we believe, in translators' hands, among them, we hope, the very exhaustive "Theory and History of Photographic Lenses" by Dr. von Röhr, which hitherto has been issued only in its original German. This work is one which stands alone in its comprehensive and scholarly review of the progress in the design of photographic objectives in all countries up to the year 1899. Its translation is a duty which we in this country owe to ourselves, for no other optical treatise is so fine a corrective of the insinuation of our natural trait of self-disparagement into the views which have become solidified here as to what has been done by British opticians. Dr. von Röhr is an historian, combining the power of broad sweeps of view with meticulous accuracy. In no other book can the work of opticians in Europe and America be so completely studied; and in none is fuller credit given to the great achievements of those in Great Britain. For the benefit of those who are to be trained for the industry of applied optics this work is one which we hope the Committee on Glass and Optical Instruments has upon its list.

* * *

Time-Exposure Printing Appliances. Looking back, as we had occasion to the other day, on the devices which have come upon the market of late years for the exposure of development papers, we were struck by the very little attention which has been given by manufacturers to printing frames or boxes which can be set to expose the paper for a definite time and to repeat this exposure, or rather any one of a series, as required until adjusted to a different time. Improvements in the direction of the rapid handling of the sensitive paper or cards have reached a point which affords pretty nearly all that is needed in speed and labour-saving, but we can recall only one appliance in the use of which the timing of the exposure is done mechanically. We believe that trade printers employ such appliances, and we should think there is room for commercial apparatus which would serve the photographer in the same way, and would eliminate the fallible element in the giving of many successive exposures required to be of the same duration. The appliance just referred to, one of the Eastman Kodak Co.'s, was practically a large drop shutter, the aperture in the falling board of which could be opened or closed within a range permitting exposures from $\frac{1}{4}$ sec. to 7 sec. For present-day requirements in printing boxes, strip printers, and the like, a much more compact device is called for. It is one, we are convinced, quite within the competence of our experimental designers.

MEASURING THE ACTION OF INTENSIFIERS: STAIN IN NEGATIVES AND INTENSIFICATION.

The paper by Messrs. Nietz and Huse, despite—or should we not say because of—its curves and mathematical formulæ, contains much of practical interest. We will not seek to examine the methods devised by the authors for expressing in figures the action of intensifiers: considerations are involved which appeal to the specialists in sensitometric methods, and will probably be debated by them. Broadly, it is apparent that the results to which these methods lead are in correspondence with photographers' practical experience for something like a generation, a fact not to be despised as a piece of confirmatory evidence, even though the high-brow specialists in sensitometric investigations may themselves be inclined to sniff at it. But, as regards the practical outcome, papers such as these can bear a good deal of paraphrasing in order that the findings of their authors may be brought reasonably within the comprehension of those of us whose judgment of negatives and prints is made in less precise terms: but who nevertheless have no such bad idea of the real qualities concerned.

Although the effects of different intensifiers have been compared by many experimenters, it has been almost invariably in a qualitative way—*i.e.*, showing the increase in the contrast in prints, not measuring it. On these lines, though in a rougher and less searching manner, much information has been gathered, though it has not always been recognised that the visible action of an intensifier on a negative tells us scarcely anything worth knowing as to its general usefulness. The present paper shows how very complex the matter is. It keeps in view the final aim—viz., an improved degree of contrast in the print. Clearly, that result is dependent on several other things than the contrast-giving action of the intensifier, as judged by the eye. It depends on the colour of the deposit in the intensified negative; also on the presence of stain in the original image, since such stain is usually a cause of contrast and may be removed in the intensifying process; and it depends also, in relation to the colour of the intensified plate, on the colour-sensitiveness of the printing medium, and, in this connection, also on the spectral composition of the light by which printing is done. In view of so many variable factors, to which must be added the idiosyncrasies of emulsions in amenability to certain intensifiers, it is manifestly impossible to apply numerical measures to intensification processes with any approach to the exactness of, say, measuring the sensitiveness of plates. The laborious processes by which Messrs. Nietz and Huse succeed in computing the photographic or printing contrast of a negative from a measurement of its apparent contrast, have, however, for the first time yielded a series of numbers, which, though they are approximate in general application, may be taken as representing the "power" of the different intensifiers—*i.e.*, the degree of contrast produced in the print compared with that in one from the unintensified negative. In this respect, and in their data as to the degree to which the colour of the intensified deposit is productive of "effective intensification," they mark a new beginning in the experimental study of these much-used processes.

From the practical standpoint an important outcome of the authors' work is the classification of intensifiers, or rather of intensifying effects, into four groups. The grouping takes into account the existence of more or less stain in the original negative and the production of an intensified image, which may be neutral or coloured, according to the process employed. These groups, as represented diagrammatically in Fig. 4, are:—

> *a.* Both visual and effective intensification. Produced from negatives having some stain by intensifiers which yield a coloured deposit, or from neutral negatives by intensifiers yielding a neutral deposit.
>
> *b.* Visual reduction, but some effective intensification. Produced by changing the original image into a coloured compound (*e.g.*, silver sulphide) without adding anything to it.
>
> *c.* Visual, but no effective, intensification. Produced in negatives with much stain by mild intensifiers yielding a neutral deposit.
>
> *d.* Visual intensification, but effective reduction. A more pronounced effect of the *c* type.

This classification will throw some light on the discrepancies often encountered in intensification, and supplies a guide to their avoidance. Take the case of a negative, *e.g.*, one pyro-developed, the image of which consists in part of stain. If the intensifier removes all or part of the stain and also yields a neutral-coloured deposit, the intensifying action will be disappointing. You lose the contrast-giving power of the stain, and if the degree of intensification is small, as by the chromium process, you don't get much in exchange for it. The authors state that in the case of heavy pyro stain the intensification, on balance, has been found to be nil. On the other hand, an intensifier which yields a coloured deposit, and also is without action on stain in the original image, *e.g.*, the various mercuric-iodide formulæ and the uranium intensifier, is liable to exceed the effect which is judged from the appearance of the negative. These are considerations, apart from the choice of an intensifier appropriate to the character of the negative, in which matter the authors offer some advice which conforms in the main with general practice.

Other measurements of theirs are no less interesting, namely, those represented graphically in Fig. 5, on the kind and degree of effective intensification. Here the height of the curve in the space of the diagram indicates the degree of action, whilst its departure from a straight horizontal line shows what is commonly called the selective character of the intensifier, greater on the light deposits than on the heavy, or *vice versâ*. Thus it will be seen that XVI., the intensifier of mercuric iodide and Schlippe's salt, published by Mr. W. E. Debenham in our issue of April 6, 1917, yields proportional increase throughout a range of densities (the effect of longer development coupled with general vigorous action). Mercuric bromide and amidol (VII.) is still more nearly proportional, though much milder in action. The bleach-and-sulphide process (XVII.) comes approximately between the two. We could have wished for data of this kind in respect to a greater number of intensifier formulæ. As it is the paper pursues the scientific examination of intensifiers about as far as it need go. The variable factors, as already said, are too many to permit of the effect of a given intensifier being expressed in figures. But the authors' work will have been worth while if it does no more than lay emphasis on the many causes for irregularity in intensification. Properly understood, it shows that regularity is secured more by adhering to regular conditions of plate, developer, etc., than by relying on the greater or less action of intensifying formulæ to put matters right. If these conditions are not realised—as very frequently they are not—a useful indication of the reason why such and such an intensifier falls short of what is expected of it is provided by the measurements which Messrs. Nietz and Huse have carried out.

THE SENSITOMETRY OF PHOTOGRAPHIC INTENSIFICATION.

(A communication from the Research Laboratory of the Eastman Kodak Company to the Royal Photographic Society.)

(Continued from page 182.)

Classes of Intensification

Before discussing the subject it may be well to emphasise the fact that intensification considered from the chemical and photographic standpoints represents two quite different conditions, and we may have the first without the latter, or the latter with very little of the first. Chemically speaking, intensification means increase in density by the addition of something to the deposit. Photographically, intensification implies that the effective contrast of the original is changed, which may occur by a change either in the colour or in the arrangement of the grains, aside from increase in the bulk of the deposit. It is readily seen that we may have chemically added density to the various densities without changing the effective contrast, the added density only necessitating longer exposure. This kind of intensification is of no advantage. This point will be made clearer by the following generalisations from our experimental data. We will consider all cases of intensification, whether they result in true photographic intensification or not.

Applying the methods previously outlined, we have found that in general so-called intensification may be of four kinds, as shown in the generalised curves, Fig. IV., *a*, *b*, *c* and *d*, where the relative positions of the curves may be somewhat exaggerated, to illustrate the point.

In IV*a* we have the normal case of an original negative of not too high colour but still sufficient to give a higher photographic than visual contrast, intensified by a method giving a fair degree of colour in the deposit. There is both visual and photographic intensification. Such methods include Desalme's copper tin intensifier, mercuric iodide with Schlippe's salt, mercuric iodide with an alkaline developer, and uranium.

In a special case of this class, $i_p = i_v$, *i.e.*, the intensifier gives neutral deposits. Such cases are mercuric bromide with amidol, and chromium amidol used with an original neutral negative, in which case $i_p = i_v$ and $O_p = O_v$.

This is the most general and most useful class of intensifiers. Some others which fall in this class, if used with neutral negatives, are mercuric chloride used with various blackening agents, such as ammonia, sodium sulphite, ferrous oxalate; Monckhoven's; acid silver; and mercuric iodide with ammonia. Further relative data concerning these intensification methods will be given.

Class IV*b* shows visual reduction but photographic intensification. This occurs, for instance, when nothing is added to the original silver but the silver is changed to silver sulphide, as by bleaching in ferricyanide-bromide solution and blackening in sodium sulphide. Here there is a slight loss in visual density, but as the deposit is coloured and passes less actinic light than before, there is photographic intensification.

Class IVc is a special case, which applies only to certain intensifiers, which give neutral deposits, used with negatives of rather high colour. In this instance the photographic contrast of the original (due to the colour) is far greater than its visual contrast. The intensified plate is nearly neutral in colour, and although, perhaps, there is visual intensification, there may be no photographic intensification. We have found this to be true with plates developed in pyro containing little sulphite (thus giving heavy colour), and intensified with chromium amidol, which bleaches out some of the pyro colour.

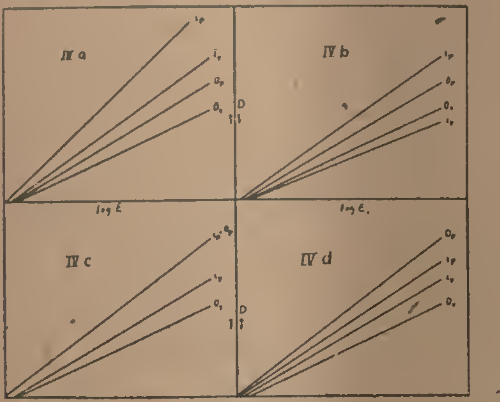

Fig. 4.

It has been possible to produce the conditions shown in Fig. IV*d*, in which we have visual intensification but photographic reduction. This was actually experimentally obtained by intensifying a pyro negative of high colour in Baker's permanganate-caustic hydroquinone formula. There was slight visual intensification, but since the pyro colour was removed by the bleach, redevelopment gave a nearly neutral deposit of lower photographic contrast than the original negative. It should not be inferred that this method does not give intensification, since with neutral negatives it is quite satisfactory, giving some increase in contrast.

In the above curves and the consideration of them, when it is indicated that, for instance, $i_p = O_p$, it does not follow that the curves are necessarily coincident, but only that they are of equal contrast and otherwise similar. This is logical, since these negatives would be exactly equivalent in printing, although one would require longer exposure than the other.

Character of the Photographic Intensification.

A method of interpreting the data, analogous to that used in showing the visual effect (Fig. II.), is applied in Fig. V., where the percentage increase in photographic density is plotted against the value of the original visual density. The ordinates represent the percentage increase and the abscissæ are the same as in Fig. II.

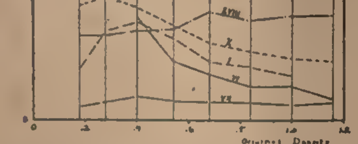

Fig. 5.

A line parallel to the horizontal axis would indicate strictly proportional intensification, the same relative amount being added to each density, thereby acting to increase the contrast in the same way as longer development would. Most intensifiers approach this condition rather closely. One of the best methods in this respect, giving also vigorous intensification, consists in bleaching the negative in mercuric iodide, washing very thoroughly, and blackening in a fresh, filtered solution of Schlippe's salt (XVI.)[3]. The mercuric bromide and amidol method (VII.) gives proportional although low degree of intensification. This, however, gave the most nearly photographically neutral deposit found. Desalme's copper-tin intensifier (XVIII.) deserves special mention. This was investigated by L. P. Clerc,[4] who was one of the few to consider the necessity of measuring the photographic effect, and to devise means to this end. However, his method differed radically from ours, and was applied only to one or two cases, notably the copper-tin intensifier mentioned above.

We also find that this combination gives photographically proportional intensification of fair degree, and it appears that it might be a very desirable method to employ. But, as we stated originally, the general practicability (permanence, colour of image, etc.) of any particular formula does not come within the scope of this paper. We wish rather to discuss intensification primarily from the standpoint of the character of the effect produced.

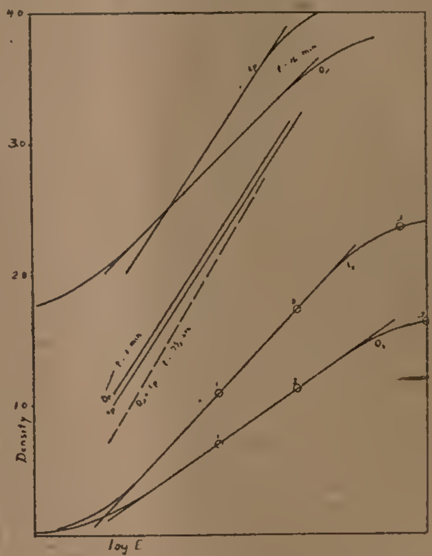

Fig. 6.

In connection with Desalme's intensifier, it may be of interest to note that although the deposit is visually quite highly coloured, under the conditions of our experiments, it was repeatedly proven to be in effect absolutely photographically neutral. This would not be true were we using a colour-sensitive printing medium. But positive film is sensitive only to ultra-violet, violet and blue, and it happens that the deposit is transparent to those wave-lengths of light to which the printing material is sensitive, whereas a yellow or yellow-brown deposit would absorb them. Hence the colour of a deposit may not always be assumed to increase its photographic density.

Using a permanganate-hydrochloric acid bleach with a sodium stannite solution as a blackener (XX.) on a pyro negative, we obtained a strongly-coloured image which showed visual intensification and still greater photographic effect.

From our experiments, it is apparent that the colour of the intensified deposit, as well as the degree of intensification, depends on the character of the original deposit, the latter being a function of the type of emulsion and the developer used.

Colour Coefficients of Intensifiers.

It will be necessary to refer again to the paper by Jones and Wilsey, in which this term is defined. Practically, the colour co-

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[3] This intensifier is the one which Mr. Debenham suggested we should investigate. ("B.J.," 1917, p. 186).

[4] "B.J.," 1912, p. 215.

coefficient of an intensifier is that factor by which we must multiply the visual contrast value of the intensified plate to obtain its photographic contrast. For example, assume the visual contrast of the negative to be 0.8. If the colour coefficient of the intensifier employed is 1.5 under the conditions of the experiment, then the effective photographic contrast of this negative will be 1.5 × 0.8 = 1.2.

An application of the conception of colour coefficient is made in the following, for which the reader is again referred to Fig. III. Here, the ratio of densities D_p' and D_v' is the selectivity coefficient, for the given density, that is

$$\frac{D_p'}{D_v'} = \text{selectivity coefficient of density.}$$

The ratio of the slopes at the point D_p' and D_v', that is,

$$\frac{\dfrac{dD_p'}{d\log E}}{\dfrac{dD_v'}{d\log E}}$$ is defined as the selectivity gradient coefficient.

In any case where the value of the selectivity gradient coefficient is constant over a range of values of log E, we may consider the plate as having a colour coefficient. Moreover, if the plate curves have sufficient straight line to determine a definite gamma, the colour coefficient is the ratio of the gammas, photographic and visual. For this case the selectivity gradient coefficient = colour coefficient $= \frac{\text{photo gamma}}{\text{visual gamma}}$. These conditions are usually fulfilled by curves obtained by sensitometric methods.

The measurement of the gammas of our curves gives us sufficient data to calculate, for various intensifiers, the values of their colour coefficients. This supplies a factor for converting the visual into the photographic contrast by taking into account the colour of the deposit. We may obtain also a factor showing the degree of increase in contrast. This is given in the third column of the table below, and represents the ratio $\frac{\text{phot. gamma of intens. plate}}{\text{phot. gamma of original plate}}$. The rule of reproduction states that the photographic gamma of the negative multiplied by the gamma to which the printing medium is developed is equal to the gamma of the reproduction. In the fourth column of the following table is given the calculated value of the photographic gamma of the intensified plate; in the fifth, the gamma to which the reproducing medium is developed; in the sixth, the observed gamma of reproduction.

It should be remembered that the following values of the colour coefficients apply only to the set of experimental conditions here met with, and that they will vary with the plate used, the character of the reproducing medium, and the quality of the light-source. But these values are useful as a means of comparing the different methods of intensification.

TABLE IV.

1	2	3	4	5	6
Intensifier.	Colour coefficient.	$\frac{\gamma_r}{\gamma_p}$	γ_p	γ_M	Obs. γ of repr.
VII	1 00	1 15	78	1 10	85
I	1 05	1 15	78	1 10	1 0
VI	1 00	1 45	·44	1 38	53
XVI.	1 90	2 50	1 70	1 10	1 63
XIII	1 17	2 28	1 54	1 10	1 55
XII	2 52	3 50	2 40	1 10	2 52
XX	1 43	2 05	86	1 38	1 14
XVIII	1 00	1 93	54	1 38	·74
XVII	1 60	1 33	48	1 38	·54
X.	1 40	1 23	·84	1·10	1 00

For the formula and name for any of the above, see Table I.

The use of this table is illustrated in part by a case of the three intensifiers VI., XVIII. and XVI. ([illegible] and acid, [illegible]'s, and [illegible] with Schlippe's salt). Here we have taken intensified plates of which the first is visually neutral and the other two coloured. Note the table shows (column 2) that, in the case of XVIII. the colour is not effective in still further increasing the contrast, since its colour coefficient is 1.00, but that with XVI. the colour almost doubles the effective contrast (colour coefficient 1.90). The relative total degrees of intensification (increase of *contrast*, not density) are given by column 3, where we find the values to be respectively 1.45, 1.93, and 2.50. Thus XVI. is the most powerful of the three.

It would be interesting to compare all intensifiers in this manner, but because of the mass of data required only representative ones were taken. Most of the mercury intensifiers are quite fairly represented by I. and VII. The acid silver, Wellington, and copper intensifiers were not practicable on the emulsion used, so that unfortunately they are entirely omitted.

Discussion—Practical.

It is hoped that the reader will find sufficient information in the foregoing to give him some idea as to the adaptability of the various forms of intensification. To come down to practical considerations, suppose we take four typical negatives requiring intensification, bearing in mind that the primary object of this process is the increase of photographic contrast in the negative to produce prints of the best quality possible. Four cases of negatives requiring such treatment are: (1) average landscape, over-exposed, and underdeveloped to save the negative; (2) average landscape, underexposed, but having faint detail, *i.e.*, the exposure of the plate lies entirely on the toe of the H. and D. curve; (3) a line subject in black and white, typical dry plates process work; (4) a pyro negative of high colour of any of the preceding kinds.

In the first case the intensifier must be strictly corrective of underdevelopment, thereby giving fair increase of contrast. If the negative is practically neutral, VI. and X. would be desirable; XVIII. or XVI. where more vigorous action is desired, that is, in cases of very little development.

In case two it is necessary to increase the contrast to a considerable extent. Here XVI. or XII. are especially applicable, the first being probably preferable.

In case three it is usually desirable to have a method capable of repetition, as well as one giving excessive density with clarity of high-lights. Monckhoven's intensifier is usually recommended. Lead could be used, but is likely to give veiled high lights.

Case four requires an intensifier of fairly high colour coefficient, or, in general, one giving high intensification, particularly as the pyro colour is likely to be partially or wholly removed by almost any of the processes. For this type the proper effect is given by XVI., XX., or XII.

Discussion—Errors in Methods.

As previously stated, the term photographic density has been used rather loosely throughout the present paper in lieu of effective printing density. These values also are not in most cases the true photographic densities and are not found by the method set forth by Jones and Wilsey. But, for the problem under consideration, and the definite materials used, the values obtained include the errors due to the failure of the given sensitive materials to act in accordance with known photochemical laws. A source of error of primary importance is the failure of the reciprocity law on the printing material used. This has not been thoroughly investigated, but sufficient evidence has accumulated to show that we are here concerned with it. This came about by the great difference in exposure required for the original and the intensified plates, due to the colour of the latter, that is, the same densities on the reproductions of the two may have been caused by widely different exposures $I_1 t_1$ and $I_2 t_2$, and these exposures may be in a different ratio from that given by reference to the curve of the printing material. Had it been possible to vary the intensity (keeping constant quality) to give the necessary exposures and to keep the time constant in the printing of both original and intensified negatives, this error would have been minimised. Further, if we could have kept the time constant and could have varied the intensity so as to give, through every deposit, an equal density on the positive film, we should have the conditions for measuring the relative true photographic densities. But, practically, this would not give the reproduction of the subject, which is the aim, and the calculations would not actually apply to ordinary printing. We have therefore employed the empirical methods detailed above, and these give what are no doubt fair comparisons.

Other factors which should be taken into account are the colour sensitiveness of the printing medium and the variation of gamma with the wave-length of the light incident on this material. A full discussion of the errors involved through these causes is not the purpose of this work. Nevertheless, we investigated several cases, in so far as these conditions applied to our experimental work. An extreme case is shown in Fig. VI.

Two strips, an original highly coloured pyro strip (O_c) and the same intensified by chromium-amidol to a much more nearly neutral deposit (i_c) were printed side by side to the same intensity for three different lengths of time, so as to bring the exposures on different portions of the H. and D. curve, as shown by the circles marked 1, 2, and 3, which indicate the highest density printed through. Had the errors due to the failure of the reciprocity law, the colour-sensitiveness of the material, and the gamma-wave-length relation not been involved, the three sets of experiments should have given identical values for the contrast and photographic densities. For the two lower times of printing, the photographic curves of the original and intensified plates are practically identical. On now printing sixteen times as long, the values are somewhat different, and the contrast of the pyro (original) strip has been reduced about 30 per cent. This latter effect has been repeatedly observed by Wilsey. However, this is an extreme case, and ordinarily, by printing through densities well up on the curve, and giving such exposures (with not too low intensity) that the reproduction lies almost entirely within the straight-line portion of the curve of positive film, these errors are in part avoided.

The writers wish to acknowledge their thanks to Mr. Alfred Hargreave, who assisted greatly in the experimental work.

In conclusion, an abridged bibliography is given, covering some of the most important papers on intensification published within the last two decades.

A. H. Nietz.
K. Huse.

Bibliography.

"Modern Intensifiers for Gelatino-Bromide Plates and their Effects," Eder, "B.J.," 1900, p. 68.

"Effect of Intensification," Eder, "B.J.," 1900, p. 469.

"A Comparative Table of the Effects of Various Intensifiers," von Janko, "B.J.," 1900.

"Theory and Practice of Intensification," Wilson, "B.J.," 1902, pp. 614, 692.

"Intensification and Reduction," "B.J.," 1903, p. 447.

"Intensification without Metallic Salts," Teape, "B.J.," 1904, p. 272.

"Intensification without Metallic Salts," Teape, "B.J.," 1904, (London), 1904.

"Theory and Practice of Intensification," Baker, "B.J.," 1906, pp. 264, 284, 309.

"Chromium Intensifiers," C. Welborne Piper, "B.J.," 1907, p. 3.

"Intensification by Increase of the Bulk of the Image Compound," C. Welborne Piper, "B.J.," 1908, pp. 195-6.

"Silver Intensification," Smith, "B.J.," 1909, p. 82.

"Quinone Compounds for Intensification," Lumière and Seyewetz, "B.J.," 1910, p. 949.

"New Methods of Intensification," "B.J.," 1911, pp. 889, 909.

"New Silver Intensifiers," Wellington, "B.J.," 1911, p. 551.

"Powerful Intensification of Gelatine Plates," Callier, "B.J.," 1911, p. 452.

"An Intensification Formula and some Tests of its Action," Desalme, "B.J.," 1912, p. 215.

"Intensification and Reduction," Bennett, "Phot. J.," 1913, pp. 214, 220.

"Intensification," Cunningham, "B.J.," 1915, p. 818.

"Intensification by Redevelopment," "B.J.," 1915, p. 426.

"Intensification," "B.J.," 1915, p. 570.

"Mercury Physical Intensification," C. Welborne Piper, "B.J.," 1916, p. 167.

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Line Advertisements' Increased Price.—Commencing with next week, May 3, all line advertisements in the "B.J." are charged at the rate of 1d. per word, with a minimum charge of 1s. Further particulars of the increased tariff will be found on page 200.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Illumination in Retouching and Finishing.

The illumination of the work is a subject which receives a good deal of attention in modern factory design. This is not only given from the altruistic point of view, but there is no doubt that more work and better work is turned out when the lighting conditions under which it is done are as perfect as it is possible to make them.

What is true of the large, well-organised factory is also true in its extent of the workrooms used in our profession. Notoriously many of them are small and ill-lighted, and we know that clean and excellent work is often produced, but how much better it is from the point of view of health and comfort if the lighting is the result of a well-thought-out scheme.

With regard to the retouching-room, many excellent arrangements of light and easel have been described in the "B.J." of recent years, and any of these can be adopted. From the point of view of the eyesight, the best advice that can be given is not to try and see the shape and effect of each stroke of the pencil, but to sit well back so that the effect of the blending of the strokes together can be seen. It must be remembered that this it is which preserves the modelling given by the lighting, and this it is too usually which our clients are looking at when they describe the finished picture as a fine photograph. For working at night a light passed through a blue solution is often recommended and used. This is probably because of the similarity to daylight and to the idea that a blue light is a "cool" light to the eyes. In my own case I find most comfort with light diffused through light *green* tissue paper.

For work in the finishing room a north light is desirable, owing to the fluctuations being less throughout the year. The windows should be high and large, and the worker should sit so that the window is to the left and partly behind. That is to say, the light should come from over the left shoulder. Particular care should be taken in the case of velvet papers to look out for patches of glare, because this, though perhaps not noticeable on the part being worked, will cause discomfort in time if it is anywhere in the field of vision.

If with all the best arrangements of lighting the work still gives discomfort to the eyes, it is probable that there are errors of eyesight which need correction. When consulting an oculist or optician about this, the nature of the work should be mentioned, and it is also an advantage to measure the average working distance in retouching and finishing from the eyes to the easel.

Finally, a word on eye-wear. The latest rimless pince-nez may be essential for the lady receptionist "of good appearance and address," but for the routine work of the darkroom there is nothing better than spectacles with curled sides that fit over the ears, and preferably made of a metal such as rolled gold or white metal which will not easily rust.—Arthur G. Williamson.

Outdoor Operating in Gusty Weather.

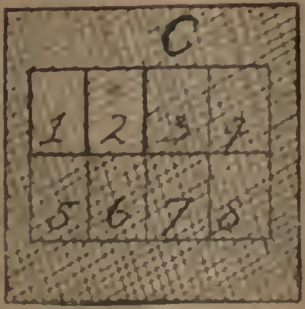
Every operator knows the trouble it is to keep the cloth over one's head when focussing in a rough wind. I have counteracted this difficulty by having a long strap made of elastic, and with a tailor's buckle sewn in the end. It is a simple matter to strap the end of the cloth firmly round the back frame of the camera, and even on the most gusty day the cloth will give no trouble in this direction if the other end is held in the hand, and focussing may be carried on without difficulty. Another source of trouble on a gusty day when using a large camera is a slight vibration of the tripod. I have overcome this by cutting three sticks from a convenient hedge and slipping them through the slots at the top of the tripod in the form of a triangle; across the middle of this is laid another piece, and from this a large stone is suspended by a piece of cord. This will be found to have a very material effect upon the rigidity of a tripod on a windy day. One further note may be avoided. The camera should be shielded from the wind, using buildings, walls, etc., as far as possible; but if these do not exist in the vicinity, then it is possible to do much at the moment of exposure by interposing the operator's body to the wind close against the camera. As far as the other requirements of the subject permit, it is as well to use a lens of fairly short focus, in order not to have the camera racked out to a great extent, to catch the wind, as in that case the action of the wind will undoubtedly cause vibration and blurred images. If the worker doubts the truth of this, let him take an ordinary half-plate camera and on a windy day rack it out to about 8 ins., and it will be found that hardly any movement is noticeable. Then extend the instrument to double that distance, and in all probability a decided motion will be observable. Many workers have to take out-of-door groups, etc., when the wind has to be reckoned with as a decided factor. This applies to many parts of England for a great part of the year, and operators will be well advised to give the points noted above their attention, for though of seemingly small importance they should be regarded as essentials, in order to avoid annoyance in the directions named.—Exeter.

Substitutes for a Repeating Back.

When taking outside groups, pictures, dances, war charity affairs, etc., there is always a chance of increasing the order by inviting individual members or couples to sit for a few miniatures. The following describes a simple way of being prepared for such work.

It would not do to use a large plate for each sitter, and it would be very inconvenient to cart about a large quantity of small plates, each in a large slide. The correct way, of course, would be to use a repeating back, but this means a lot of weight to carry about, if the operator possesses them, and if he doesn't he may not feel justified in further expense.

Provided the camera lens is of good covering power, small photos can be taken one after another on the same plate by using two or [illegible] pieces of cardboard blackened. If [illegible] board cannot be obtained, double thicknesses of black paper glued together and dried under pressure will do, but these must be carefully kept very flat.



flat. The cards are cut to fit exactly into the [illegible] back of the camera, and the card must be thin so that the back will fit over a card without undue strain. In the centre of each of these cards [illegible] the outline of the plate used.

This is divided into a number of sections, equal to the number of miniatures it is desired to take on one plate. They may be 2, 4, 6 or 8; a half-plate will give two quarter size, three [illegible] panels, four 3 x 2½, six 2 x 2, or eight 2 x 1½. A [illegible] plate [illegible] two or three useful sizes, and a quarter-plate two.

As an illustration, the illustration shows the cards necessary for [illegible] eight on a half plate. C represents the card with half-plate outline drawn [illegible] and lines drawn dividing it into eight equal parts.

In one card the section 1 only is cut clean out, and in the other No. 2 only is cut out. By placing either one or the other card under the back of the camera in turn, any one of the eight portions of the plate can be used.

For No. 3 the second card is used with right side turned to left, for Nos. 5 and [illegible] used upside down, while the first card will give any of the four corners.

This can be used both vertically and horizontally.—H. J. A.

Exhibitions.

HAMPSHIRE HOUSE PHOTOGRAPHIC SOCIETY.

Once again, despite the disabilities of the time, the Hampshire House Photographic Society have brought together a collection of photographic work by their own members and outside contributors, which provides an interesting hour for any photographer who cares to thread his way through Hog Lane to the picturesque old house, which is the society's headquarters. The exhibition is open (free) only during the daylight hours of from 4 p.m. to 7 p.m.—a discreet provision in view of the suspicious character of the approach. The exhibition remains open until May 17. If any fault may be laid to the account of the organisers it is that of hanging too much, particularly in the open section, where some really interesting work is thereby skied. In this section Mrs. Mania Pearson, who is one of the medallists, appears with an altogether new style of technique, appropriate perhaps, to the lighter themes which she portrays, but in technical quality not to be compared with the admirable studies in tones of a lower key, which during the last year or two have made her work notable. Another medal goes to the Rev. R. F. Caudwell for a portrait of Furley Lewis, distressing from the mark of illness which it records upon the face of our old friend, but photographically a fine piece of composition somewhat in the style of Furley Lewis's own work. A foreground study of Chiswick by M. O. Dell is a broad composition which secures a big effect in a narrow range of tones. The remaining medals in the section go to Marcus Adams for a characteristically fine piece of portraiture, and to E. A. Pinchin for photo-micrographic exhibits. Among much other work which is outstanding for its pleasant photographic quality may be mentioned the exhibits of C. Beauchamp Hall, G. C. Weston, and J. B. Portway, senr. Two colour prints by Dr. Alex. Hamilton apparently owe as much of their colour to adventitious pastel as to any photographic process.

In the Members' class the medalled exhibit of Isleworth, by A. H. Page, is a dramatic piece of river and cloudscape, which amply deserves its distinction.

Lantern slides and colour transparencies form quite a large class, the strength of which is contributed chiefly by Mr. Louis J. Steele, whose "Bargehouse" receives a medal.

FORTHCOMING EXHIBITIONS.

April 19 to May 17.—Hampshire House, Hammersmith, Photographic Society. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2, or W. F. W. Somers, 201, Goldhawk Road, London, W.12.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, March 25 to April 6.

Roll Film Apparatus.—No. 5,366. Apparatus for developing, fixing, and washing roll-film. H. S. Laycock and J. A. Wallace.

Cameras.—No. 5,299. Cameras. J. P. Moore.

Cameras.—No. 5,753. Photographic cameras and auxiliary apparatus therefor. L. P. Ravald.

Printing Frame Stands.—No. 5,683. Photographic printing frame stands. G. D. Williams.

Cameras.—No. 5,869. Photographic cameras. H. J. Craymer.

Printing.—No. 5,931. Photographic printing. R. Dubois.

Film.—No. 5,810. Manufacture of photographic negative film. E. F. Burnett.

Cinematography.—No. 5,670. Shutters for cinematograph apparatus. P. Cornish.

Cinematography.—No. 5,892. Metal joint for repairing cinematograph films. E. Hare and J. Taylor.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Film Cameras.—No. 113,998. (March 3, 1917.) The invention consists of a reel (for the band of film) of triangular section, and made so as to hold one end of the film band. A reel of this pattern is used, in conjunction with other mechanism, to bring sections of the film band automatically into position for exposure. Sydney Chaillé Swann, 914, Seminary Avenue, Richmond, Virginia, U.S.A.

Transparency Frames.—No. 109,532. (November 14, 1916.) A frame which has the appearance of an ordinary mirror, but permits of a photographic transparency being viewed from one side or the other. It consists of two thinly silvered screens of suitable thickness mounted in a frame with the photographic transparency between them. By subjecting one surface or the other to a sufficiently stronger light than the other, the subject of the transparency is viewed alternatively from either side. H. A. Millar, 54, Broad Street, Teddington, Middlesex.

Film Spools.—No. 109,860. (October 21, 1916.) The claim is for a spool of sensitive film, having an extra protecting band (between the film and the paper backing) in the shape of a strip of very thin and transparent collodion film. Société Anonyme des Celluloses Planchon 287, Cours Gambetta, Lyons, France.

Cinematograph Shutters.—No. 109,879. (November 16, 1916.) A shutter of compound type, consisting of two similar discs fixed at a distance apart on a single shaft, and with the apertures in alinement. The shutter is placed so that one disc comes behind the gate and the other in front of the lens, with the result, it is claimed, of making half the travel and occupying half the time in cutting off the light, compared with one of the single-disc type. Reginald Wardley, 15, Dale Street, Castleton, Manchester.

Cinematograph Projection.—No. 110,115. (May 2, 1917.) The invention relates to the projection of several cinematograph pictures simultaneously upon different parts of a large screen, *e.g.*, for the purpose of forming one large composite moving picture. Its claim is for a picture-element serving to provide a series of frames for the various single projections, and thus to mask any lack of register in them. Such picture-element, *e.g.*, the trunk and branches of a tree, may be painted on the screen, or may be an image projected on to it. Langdon McCormick, 305, West Thirty-eighth Street, New York.

Cinematograph Shutters.—No. 110,460. (January 24, 1917.) The claim is for a shutter consisting of a disc with openings of such size and position that the two blades thus formed are of unequal size. In the smaller blade is an aperture covered with wire gauze. T. H. Hodgkins, jun., 33, Gilbert Road, Redfield, Bristol.

Cinematograph Mechanism.—No. 110,489. (June 28, 1917.) An exhausted glass chamber is placed between the light-source and the film, preferably between condenser and light-source, for prevention of over-heating of the film. Frederick Chetwynd Jessett, 15, Sutherland Place, London, S.W.1, and Charles William John Furmedge, 32, Melrose Avenue, Mitcham, Surrey.

Cameras for Colour Photography.—No. 110,595. (October 25, 1916.) The invention relates to prism attachments in a one-lens three-colour camera, one or more prism-reflectors being placed obliquely in the optical axis of the lens and being adjustable in position. The sensitive plates may also be angled in respect to the lens axis. Application of the invention to cameras for colour cinematography is described in the specification. William Henry Doherty, 7, Woodward Park Street, Dorchester, Mass., U.S.A.

Printing Frames.—No. 111,240. (April 27, 1917.) The frame is provided with a sliding shutter, which is automatically locked in the open position, but is closed at the expiration of a predetermined time by the operation of a clockwork mechanism. Frederick John von Gunten, 200, Colony Street, Winnipeg, Canada.

Meetings of Societies.

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MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, April 27.

Huddersfield Naturalist and Photographic Society. "The Idle Moments of an Idle Photographer." J. H. Carter.

Tuesday, April 30.

Royal Photographic Society. "West of England Notes." G. Avenell.
Birmingham Photographic Society. "Corals and Coral Islands." W. H. Edwards.
Manchester Amateur Photographic Society. "Enlarged Transparencies and Negatives by the Wet Plate or Collodion Process. F. G. Curzon, President.

Wednesday, May 1.

Croydon Camera Club. "After-Work on the Print." G. C. Weston.
Photo-Micrographic Society. Members' Evening.
Edinburgh Photographic Society "Trimming *v.* Mounting Prints." J. Wanless.

Thursday, May 2.

Sunderland Photographic Association. "Amateur Photographer" Prize Slides.
Hammersmith (Hampshire House) Photographic Society. "Westminster Abbey." F. H. Evans.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held on Friday, April 12. Present:—Messrs. G. Hana, R. N. Speaight, J. W. Beaufort, H. A. St. George, W. E. Gray, Frank Brown, S. H. Fry, A. Mackie, Lang Sims, Gordon Chase, A. Corbett, J. G. Wakefield, R. Haines, and A. Basil.

This being the first meeting of the Council after the annual general meeting, the Standing Orders of the Council were read, and were confirmed without alteration. Mr. S. H. Fry was unanimously re-elected Hon. Treasurer; Mr. Alexander Mackie was unanimously re-elected Hon. Secretary.

The resolution passed at the annual general meeting that the Council be requested to consider the practicability of training and employing disabled soldiers and sailors as photographic workers, and to make a report, was considered. Further consideration of it was adjourned, the feeling of the Council being that the question in its broad signification is one involving a great many points which require very careful discussion from various points of view. It was necessary to decide whether it is desirable (in the interests of those whom it is intended to help) to encourage an influx into the ranks of a profession in which the assistants, except in cases of exceptional ability, have in normal times always been an ill-paid class; and there especially was the further fact that during the war a large number of persons have been taught, or partially taught, certain photographic processes, and in many cases may wish to adopt photography as a means of livelihood instead of returning to their original pursuits.

A member of Council present having stated that he had been requested to bring before the Council a request by a member that the Council should oppose the passing of the Man Power Act, the Council agreed that, as a section of the community, photographers were not entitled to have their special interests considered before the general interests of the country, and that it was the duty of every photographer individually to do his bit for his country.

A letter was read from a member who complained that a condition was inserted in every permission to photograph issued by the Minister of Munitions that all negatives and prints of the subjects taken must be handed to the firm on whose behalf the photographs are taken. Several members of Council present stated that this condition was in all permissions granted to them. It was agreed that this condition must have been made by the Ministry of Munitions for what appeared to them a good and sufficient reason, and as the permission was in the nature of a privilege rather than a right, it was neither good policy to protest against it, neither was any protest likely to have any effect.

A letter from a member drew attention to a notice given by certain firms of photographic manufacturers that goods ordered would be invoiced at the price current at the time of delivery. The Hon. Secretary stated that the nature of his reply was that if the order were given in writing with the price stated therein, and it be made a condition of the order that the goods be delivered at that price, and the order were accepted, it would constitute a contract against which the notice would be without effect.

The Hon. Secretary reported that he had been requested by a [illegible] The member had [illegible] threatened the firm to place the case in the Association's hands. This had naturally destroyed any chance of [illegible], and he had been obliged to warn the [illegible] that the only [illegible] was to pass the [illegible]'s [illegible].

CROYDON CAMERA CLUB.

Mr. J. [illegible] Lyle gave a most interesting and thoughtful paper on "Impressionism: Before and After"—so far as can be remembered, the first comprehensive review on "modernism" given at the club, and one impossible to do justice to in an abbreviated report.

It must be understood that the word "modernism" is used in a comparative sense, for what is modern to-day is classic, and [illegible] to-morrow. Of the impressionists the lecturer spoke highly; as regards the post-impressionists, or futurists, the [illegible]. The cubists were touched upon in sarcastic vein, and although the [illegible], [illegible], and vorticists, [illegible], to mention a few names that occur to the mind, were not [illegible] mentioned, they apparently fall under the ban. To all [illegible] the [illegible] degrees of [illegible] in thinking. Speaking generally, and for the moment not quoting Mr. Lyle, the essence of ultra-modernism appears to be an [illegible] to merely [illegible] expressions of objects and ideas, which in their turn, being more [illegible] than the exhibits themselves, [illegible] as they are intended to be. Mr. [illegible]'s gay and festive attempt to "vorticism" an [illegible] photograph [illegible] will be remembered [illegible] the delightful and humorous picture to the exhibition of the Camera Club. A [illegible] of the [illegible] of [illegible] is of course [illegible] to the [illegible]. We [illegible] heard of the old [illegible] of taking a [illegible], placing his [illegible] on the table or floor, and then drawing [illegible] twenty times, when the [illegible]. Strangely enough, Mr. [illegible]'s [illegible] fact in his career [illegible] the right [illegible] [illegible]. Possibly a reflection of [illegible] [illegible] designation, [illegible] rate, [illegible] at present [illegible].

The lecturer, after [illegible] by a [illegible] of [illegible] impressionism and photographers, [illegible]. This [illegible] might appear somewhat [illegible], but it is a fact that many impressionistic painters have been accused of the photographic [illegible], while not a few photographers have [illegible] on the ground that they [illegible] to be impressionists. The school of impressionists is [illegible] of French origin. French art [illegible] back no further than the [illegible] century, may be divided into three [illegible]: the [illegible], the romantic, and the realistic, of which the impressionists may be said to be an offshoot. French art as a whole [illegible] [illegible], and has [illegible] been an expression of the [illegible] rather than the [illegible]. It [illegible] a high standard of [illegible], and good taste, and [illegible] is at the [illegible] of the art world. The lecturer then gave a short [illegible] of the intervening period [illegible] to the present time. Speaking of Corot, he said his [illegible] "effect," and he revels in light and atmosphere. [illegible] a painter of landscape, he [illegible] more [illegible] than any other painter of his time. His pictures [illegible] with the poet's sense that they may [illegible] be termed [illegible], [illegible] in the [illegible] to express a [illegible]. A [illegible] characteristic of Corot's [illegible] is their [illegible].

Impressionism is an evolutionary product of the painter's art, not a mere freakish and transient phenomenon. The origin of the phrase has been traced to a catalogue of Monet's pictures exhibited in 1867, in which occurs the passage: "It is the effect of [illegible] to give to a painting [illegible] a character that [illegible] resemble [illegible] portrait, [illegible] the painter has only thought of rendering his impression." An alternative theory ascribes the name to the title of a picture by Monet. Manet is one of the most noteworthy painters of our age, and the first to make a complete break with tradition. He discovered that a far greater sense of verity is obtained by getting as near as possible to the actual rather than by being content with the relative value of every detail. Applying Manet's method to out of doors painting, the "plein air" school began to produce landscapes in which they confined their efforts to those values which it is in the power of pigments to reproduce. Hence the greyness of the most successful landscapes of these workers. Then Monet appeared, and impressionism won instant recognition. He maintained that light is the most important factor in painting out of doors, and created a greater illusion of sunlight than any of his predecessors. To sum up, the realists painted values in a relative scale; Manet and his school painted actual values within a limited range; Monet and his successors painted actual values in a wider range, *plus* sunshine.

Impressionists base their effects on the colours of the spectrum, admitting only six colours to the palette, which are laid on with as little previous mixing as possible, and are not fused on the canvas. Hence the broken character of touch in this style of painting. Degas carried impressionism further in his expression of momentary action and effect of artificial illumination. In 1886 a new scientific method of colour ("pointillisme") was introduced, and consisted in placing on the canvas a series of dots in unmixed paint. It is not essentially impressionistic, and has been fully considered by Mr. Tilney in his book "The Appeal of the Picture," which the lecturer strongly recommended all to read.

In this country impressionism finds its expression in the later work of Turner and Whistler, the former having anticipated the French school in his treatment of skies and sunshine. Mr. V[illegible] Lyle here dealt at some length with the state of art prior to Turner and the [illegible] established by what in photographic craft is known as "selective focussing," a close but not exact analogy existing in painting. The impressionist does not give so much detail to a face in a full-length portrait as to a head alone, nor to twenty figures on a canvas as to one. At his best he has been defined as "the painter who, out of the completed contents of vision, constructs an image modelled upon his own interest in the thing seen, and not on that of an imaginary schoolmaster."

Following came outbreaks of "Post-Impressionism," or "Futurism," individuality being expressed by a species of running amok. It is a commonplace of history that art and culture, no less than national growth, are subject to evolution, during which many aberrations and eccentricities are born, only to meet a premature death. He regarded the extremists as of this order; some were sincere, but others were not. The post-impressionist's outlook is, apparently, quite simple: he must reproduce not the appearance of a thing so much as the essence of it. If he paints a door, the door must fly open and hit you in the face. Given a full-length portrait of a lady in evening dress and shoes, he ignores the lady and calls it the "White Shoe." But the shoe is pink. No matter; it is the spectator's and not the artist's sense of colour which is defective. If the lady's features resemble a bruised lemon, this does not signify a domestic disagreement, but merely the more intimate vision of the artist as compared with that of the vulgar herd. If post-impressionism is insanity, then cubism in its worst form is homicidal mania, as, for instance, when the head of a girl is represented by a bundle of bricks. Examples may be multiplied, but to dwell long on such displays of "sound and fury, signifying nothing" is to attach undue importance to transient eccentricity.

After a long discussion a most hearty vote of thanks was accorded Mr. Lyle for an evening highly educative and also amusing, and an apology is due to him for the massacre of his lengthy contribution in an attempt to furnish a report of reasonable dimensions.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the annual general meeting held recently it was reported that meetings have been well attended, and the lectures and demonstrations have been unusually successful, having had an interest for all grades and classes of workers. Six new members joined during the winter session, and although the old society room is still unavailable, it has been possible to carry on. Two members had prints accepted and exhibited at the London Salon, and Mrs. Constance Nunn obtained an award for a picture taken at the Affiliation Society excursion to the Zoo.

The circulating portfolio has proved quite an attraction this year, and an exhibition of the portfolio work held a few weeks ago resulted in Mr. Mauger being awarded the Bronze Plaque for a set of six portrait studies. The exhibition brought in two new members for the portfolio section, and to overcome the wall-space difficulty Mr. White constructed some very ingenious folding screens.

Monthly competitions have always been a feature of the South London, and the entries this year are fully up to the standard. There is one feature that has helped the Society greatly, and that is punctuality in commencing to scheduled time. This, it has been found, has been greatly appreciated by visiting lecturers, who had to depend upon curtailed travelling facilities.

The officers elected for the forthcoming year are as follows:—President, Mr. F. W. Slater; Secretary, Mr. E. W. Brooks; Committee, Miss M. A. Smart, Messrs. H. Richards, Gideon-Clark, R. M. Davies, L. J. Blake, C. H. Oakden, E. W. Taylor, Horace Wright, E. R. Bull, and W. B. Ashmole; Delegates, F. W. Slater and Ernest W. Brooks; Hon. Portfolio Secretary, W. E. White; Hon. Lanternist, Mr. C. Mauger. The summer programme is now being arranged, including, it is hoped, three afternoon excursions to Kew, the Zoo, and Lincoln's Inn, in addition to other outings, which will be arranged at members' requests.

Commercial & Legal Intelligence.

Brasted Photographer's Affairs.—At Tunbridge Wells County Court Mr. R. Vaughan Gower applied for the discharge of Henry Jas. Hubble.—The Official Receiver (Mr. T. Gourlay) stated Hubble was a photographer, tobacconist, etc., at Brasted, and later a motor engineer at Westerham, and his deficiency totalled about £325. Debtor had admitted knowledge of his insolvency nine months before the receiving order was made. Proper books had not been kept.—Granted, suspended for two years.

NEW COMPANIES.

Eracam, Limited (149,969).—Private company. Registered March 25. Capital, £21,000, in 20,000 7 per cent. preference shares of £1 each and 20,000 ordinary shares of 1s. each. Manufacturers of cameras, photographic and cinematographic appliances, etc. Directors: E. W. Janson, T. Paget Tomlinson, and W. Smellie. Registered office: 18, St. Swithin's Lane, E.C.

News and Notes.

Prohibition of Photography.—At Lewes Petty Sessions a visitor from London who photographed German prisoners at Falmer was fined £1. A Canadian private, for photographing a group of soldiers at East Blatchington, was ordered to pay the costs of the summons.

Boots' Portrait Mounts.—In the advertisement last week of "Cranley" postcard mounts the cropping up of a printer's "quod" made the dozen price appear as 106s. instead of 6s. The error will have been obvious from the difference of type, but it is still worth while to correct it.

Sir Cecil Hertslet, formerly Consul-General for Belgium and President of the Photographic Convention at its Brussels and Amsterdam meetings, has just completed his fiftieth year of service in the Foreign Office. His father, Sir Edward Hertslet, served nearly fifty-six and his grandfather nearly fifty-seven years in the same office.

Leicester Photographer's Death.—The death is announced of Mr. J. W. Burton, formerly in business for many years as a photographer in Leicester. As a Liberal in politics he represented the Belgrave Ward on the Town Council from 1899 to 1905, and took a great interest in the work of the Education and Library Committees. He was a member for nearly fifty years of the Free Christian (Unitarian) Church.

Mr. Ernest Brooks, formerly on the photographic staff of the "Graphic" and for many months official photographer in France, has been awarded the Croix de Guerre by the President of the French Republic. The award was made in recognition of the gallantry shown by Mr. Brooks in volunteering to make a dash in his car for a French village then under heavy fire in order to bring out some French civilians, including some old folks and a little girl, all of whom were rescued uninjured. The outward and return journey had to be made along roads which were being vigorously shelled. Conspicuous courage was shown by Mr. Brooks's driver, who has also been decorated.

To Receptionists and Others.—Since line advertisements for the "B.J." frequently pass through the hands of receptionists, their attention is drawn to the fact that these announcements cannot be inserted unless fully prepaid. The increased tariff, which comes into operation with the issue of May 3, will be found on page 200. And among the advertisements this week receptionists will find a schedule by which the number of words in an announcement may be reckoned correct to within a penny. As a safeguard against delay in the appearance of advertisements from insufficient remittance, it is worth while to keep this schedule where it can be found when wanted.

Extracting Lens Cells.—Writing in the "English Mechanic," Mr. J. W. Banks says:—I have for years had no difficulty, when ordinary hand-pressure fails, of extracting cells. Being once in this predicament, my eyes fell on a pair of tongs amongst the fire-irons, made from a piece of round iron flattened for a few inches to form the bend of an elongated U.

Fortunately, the diameter of bend was similar to that of the cell of objective—4 in. In less than a minute the otherwise intractable cell was out.

This is a most useful tool in any workshop, especially that of a jobbing optician, and I have a series of them, which, together with a few thin metal linings, I can deal with any fast cell from one to ten inches. If there is any suspicion that the threads are crossed, the cell should for a commencement be screwed and unscrewed very slightly.

Photography in London Docks.—At the West Ham Police Court Samuel Cohen, photographer, High Street, Stratford, E., appeared on adjourned summonses for entering a prohibited area and having photographic plant in his possession there without first obtaining the consent of the competent military authority. When the case was before the court a few days ago (as reported in last week's "B.J.") it was stated that, it being found necessary for the crew of a vessel in the docks to be photographed and the regular photographer failing to keep his appointment, the defendant was sent for to do the work. He did so, and was stopped at the gate with his apparatus and plates, which were seized. The case had been adjourned for the plates to be developed, and it was now stated that the police were quite satisfied that the defendant had not photographed anything other than he was asked to.—Mr. Cousins dealt with the defendant under the First Offenders Act, and dismissed the summons.

War-Photographers in the Battle.—Everybody at home (writes the "Times" correspondent) will learn with great regret that one of the official photographers, Lieut. Armand Console, has been badly wounded. Out here we are all extremely sorry, for the photographers have, to a man, displayed extraordinary gallantry throughout the war, and no one of them but has had countless escapes so narrow as to be almost miraculous. Nothing but amazing luck, or the Providence which overlooks brave men, has protected them so far.

In this case the photographer was in his car going up to the front along one of the roads in the Béthune area when a shell exploded close by, injuring the driver in the knee and smashing the photographer's right leg so badly that amputation was necessary. According to the latest accounts he was doing well. One of the wounded man's colleagues was in Bailleul and took a number of excellent photographs while fighting was going on in the streets, and within an hour of the Germans' final occupation of the place. You will doubtless soon have an opportunity of seeing the photographs, and will be able to appreciate the coolness and courage required to get them.

Tribunal Appeals.—At Winchester City Tribunal further exemption was sought by a photographer, 38, Grade 2, whose partner joined up in the early days of the war, leaving him in sole charge of the business. He had previously been exempted six times. —The National Service Representative opposed further exemption on the ground that the business could be managed by a woman.—Mr. B. J. Harris [illegible] appeared for the applicant, and said that since [illegible] he had repeatedly advertised for an operator [illegible]. He had altogether sixteen replies. Of these eight failed to reply to queries, and the other eight were all unsuitable.—The Tribunal decided to adjourn the case for two or three weeks.

At [illegible], a photographer, B 1, applied for a renewal of exemption.

The Chairman: Is it necessary to keep your business open?

Applicant: It is a necessary business.

Alderman [illegible]: Surely people could do without photographs being taken.

It appeared that applicant had serious financial liabilities, and the Court said that under the new Act applicant could go to the [illegible] Court and get release from his lease.

The Chairman: First of August final.

Correspondence.

·.· Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.

·.· We do not undertake responsibility for the opinions expressed by our correspondents.

OLD PHOTOGRAPHIC LITERATURE.

To the Editors.

Gentlemen,—Noticing Mr. Frederick T. Corkett's correspondence re the above subject caused me to look up Orr's "Circle of the Sciences."

The set of books which I have was published by Houlston and Stoneman. Vol. 7, published September, 185[illegible], contains some [illegible] pages of [illegible] printed matter on "Photographic Art," by Marcus Sparling, Esq., described as assistant to Roger Fenton, Esq., in taking the Crimean Photographs.

Included in the above are some 1[illegible] pages on the "Optics of Photography," together with diagrams.

Thinking this might be of some further interest as the date is [illegible] prior to that quoted by Mr. Corkett.—I am, yours faithfully,

ARTHUR CLARK.

[illegible] Road, [illegible].

HYPO RECOVERY.

To the Editors.

Gentlemen,—You recently have had some notes on this subject, [illegible] of the war period. As the investigation into the matter is so fresh, is there not a possibility that it has not proceeded on the best lines? Suppose I suggest another course, although I lack the means to carry it out. We have, then, a bath of hypo rendered useless by the presence of some salt of silver, probably largely the [illegible] of silver. Now, it is not a [illegible] to [illegible] from the fact that silver is a metallic [illegible]. If a piece of [illegible] copper is left in a used bath of hypo it will in the course of [illegible] be [illegible] and if the bath be kept fairly [illegible] by [illegible] plates or papers before fixing the deposit will be [illegible], so by this means the silver would be got rid of, and [illegible] the copper the silver can be saved and the copper plate used again. The question is what remains? Would it not be a [illegible] and hypo, and would the [illegible] [illegible] the fixing power of the latter?—Yours faithfully,

F. A. NORTON.

[illegible] Road, Cardiff.

[The deposition of silver by a metal is a possible but not a practicable process. Copper acts very slowly, and, of course, there passes into solution a quantity of copper equivalent to the silver deposited. Zinc is more rapid in its action, but makes a horrible mess of a hypo bath, [illegible] unfitting it for further use.—Eds. "B.J."]

PHOTOGRAPHERS AND THE MAN POWER ACT.

To the Editors.

Gentlemen,—I have read with a great deal of interest your article in the current issue of the "B.J." on the above Act and its effects on the professional photographer, and your readers will doubtless feel grateful to you for the sound advice and hints contained therein. But I must enter a strong protest against one paragraph in that article, in which the writer, speaking of the portrait photographer, says, "His work has a sentimental value, but is no more necessary in such times as these than is the jeweller or florist."

I am wondering whether the writer of that sentence has any "dear one" or relatives engaged in this awful war, and, if he has, I am wondering whether he can recollect what keepsake he and they wanted most to keep as a permanent record to stir the memory for each other, and does he know of any keepsake that does this like a portrait?

Every man who has left these islands to do "his bit" has had to wrench himself away from some loved one, and he has taken away with him the only true memento he can take of that loved one, viz., a portrait, very often on the humble postcard, but among the treasures in "Tommy's" or "Jack's" kit nothing is more valuable to him than the portrait of the loved ones he is fighting for. In this portrait he finds something to comfort him; the faces look at him and he feels they are very near to him, and not separated by probably many miles of sea and land, and thus the keen edge of the longing for home is taken off. He realises at every look more than ever what he is fighting for, and all this tends to strengthen his moral, which is beyond dispute the fighting man's greatest asset.

What of the mother, wife, children, or sweetheart left at home? The breadwinner has gone, often at great sacrifice and loss. What greater comfort can they have than the portrait of the loved one "gone West" or still fighting on that they shall be free?

I wonder how many thousands of women nightly pray before the portraits of their loved ones that He who guides all our destinies will bring that loved one safely home? Is this all mere "sentimental value"? In my humble judgment it is a work of the greatest national importance, every bit as important, if not more so, than the thousands of pounds spent weekly to entertain our troops. Anything that, in these times of stress and anxiety, puts heart into and cheers up those left behind, and encourages and helps them to keep a brave face to the enemy, is an asset of the greatest national importance. What can take the place of a portrait except the person it portrays?

I am sure that any Government would have a very rude shock if they took any legislative steps seriously to curtail or put out of business an industry that is playing such an important rôle in helping to win the war. My business brings me in daily contact with hundreds of portrait men, the majority of whom are working fourteen to sixteen hours daily, and who never dreamed when the war broke out that their businesses would be called upon to play such an important part in the war, and any *successful* business to-day is a national asset from a taxation point of view. It is rumoured that the next Budget will put a tax on photographs. Evidently the Chancellor of the Exchequer is of a different opinion from the writer of your article, and thinks its industry of sufficient importance to produce revenue.

In conclusion, sir, I fail to see how, from any point of view, you can justify the statement in your article, and I feel sure that the majority of your readers will feel as I do. Trusting you will be able to give this letter the same prominence, yours truly,

4, [illegible] Road, Bristol. J. C. WYNN.

[We are thoroughly in agreement with every word which our correspondent says of the moral-preserving value of photographs. But in taking a sentence away from its context he obscures the fact that we were putting forward the view which military and national service authorities have taken and will, we think, continue to take. The numerous tribunal decisions express this view, and some have done so very emphatically. Clearly it would have been foolish of us to have glossed over the facts. In the present circumstances we do not think the authorities will consider for one minute that they are reducing the moral of the armies by calling up such fit men as they can find in photographic businesses while holding others liable for service. That is the real point at issue at the present time, and the wisest course is to do what is possible to provide for the contingencies which it involves.—Eds. "B.J."]

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

A. JONES.—Estimates can only be very rough, but say (1) 25s.; (2) 10s.; (3) £4 for 10 inch roller.

TEAK TANK.—You can try a good coat of asphalt varnish, but very doubtful if it will make a job of it. Tank must be thoroughly dry and varnish used thin and well brushed in.

DR. A.—The best book giving an insight into the methods of colouring photographs which are used for the work from professional studios is Johnson's "Retouching and Colouring Photographs" supplied by our publishers, price 2s. 9d., post free.

H. S. NELSON.—You have no need to do anything to protect your copyright. By the 1911 Act the registration previously in force was abolished. You should get our handbook, "Photographic Copyright," which may save you pounds in the event of an infringement.

BOOKMAN.—Little demand for the short runs. You might send your list to Librarian, Patent Office, 25, Southampton Buildings, on chance of it containing volumes they lack. Should hold the News Year-Books, or offer them to Eastman Research Laboratory, Rochester, U.S.A. We note they are not in their catalogue.

BRIXTON.—"The Wet Collodion Process," by Arthur Payne (Mawson and Swan, Mosley Street, Newcastle-on-Tyne, 3s.) "Practical Enlarging," by R. Child Bayley. (Iliffe and Sons, 20, Tudor Street, London, E.C., 1s. 6d.) "The A.B.C. of Autotype Carbon Printing." (The Autotype Co., 74, New Oxford Street, London, W.C.1, 1s. 6d.) Postage for each of above books would be about 3d.

G. F. D.—No doubt pyrocatechin was made by the Germans, but it was not a specialty of theirs, and we have no doubt you could get it at the present time at the price of about 1s. 6d. per ounce. It is some years since we used pyrocatechin developer, but if our recollection serves us aright the single solution developer was usually of a brownish tint although without any staining action on the negatives.

B. S.—A varnish for electric-light bulbs is made as follows:—Mix the white of one egg, previously well beaten to a froth, with one pint of distilled water. Filter, and skim the surface free from bubbles. The globes to be coloured are thoroughly cleaned and polished then dipped in the liquid and hung up to dry. When dry the dipping is again repeated, and they are dried again thoroughly. The colouring solution is made by dissolving 10 to 30 grains of any soluble aniline dye in 4 fluid ounces of collodion. In this the prepared globes are dipped and hung up to dry. The dipping is repeated if a darker tint is required.

EASTMAN RESEARCH PAPERS.—I would be very glad if you could tell me if the various "Communications" from the Kodak Research Laboratory which are issued from time to time have been published in collected book form. If not, is Sheppard and Mees's book the best and most recent summary of photographic science? A French work on the subject would be of use to me, but I cannot read German.—WILL. F. TAYLOR.

Two volumes of abridgments of the scientific papers have been published by the Eastman Kodak Co., Rochester, N.Y., U.S.A. They are not distributed indiscriminately, but those interested i the study of the subjects can obtain copies on application. The book by Sheppard and Mees is of 1907. We know of no French work of the kind.

C. C.—1. We have never made any tests, but we should say that your method is no less efficient in removing the hypo than washing once and for all after fixing. 2. With frequent complete changes (viz., every five minutes) it is ample washing. 3. No doubt you can ad about 1 oz. of alum, dissolving this first with the metabisulphite an adding the mixture to the hypo dissolved in water, but why not use one or other of the properly balanced fixing-hardening bath given in the article in the "Almanac"? 4. It depends largely o the plates: with some it is necessary to add bromide to get pluck We should say that 5 minims of 10 per cent. bromide solution i a reasonable quantity per 2 ozs. of the working tank developer. 5. You can keep potass bromide and crystallised soda carbonat for almost any reasonable time in paper wrapping, but soda sulphite will speedily "go off" unless bottled, and it is impossib to keep any anhydrous salt in paper for anything more than a da or two.

W. W.—Apart from temporarily touching up the photograph before making a copy negative (see note in the "B.J." of April 5, p. 158 the best advice we can give you is to use a process or photomechanical plate for the copy negative. You ought to be able to get any degree of contrast in this way; usually the danger is in the direction of getting too much. You do not say what are your means of enlargement, but if you happen to be working by arc light you can very likely get a satisfactory enlargement from your exisiting copy negative by using a gaslight paper. With good daylight you could perhaps still use gaslight paper although the exposure would probably run into half an hour or so. A good many of the enlargements made from poor amateur negatives by trade workers owe their good quality to the fairly contrasty slow development paper such as New Kodura Slow. But if this is to be a practical process you must have an arc light projector and large-aperture projection lens.

The British Journal of Photography

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which, as already notified, comes into operation in respect to al announcements for next week's issue, May 3.

Since advertisements cannot be inserted until fully prepaid, senders o line announcements are asked to bear in mind this revised tariff, and t make use of the schedule on page xii, by which the number of words in any announcement can be reckoned correct to a penny. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less	1/-
Extra words	1d. per word.

(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

For words "Box No." and office address in adv't add 6d. per insertion.

For forwarding replies ... ... 6d. per insertion for each adv't.

If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 3026. Vol. LXV. FRIDAY, MAY 3, 1918. Price Twopence.

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SUMMARY.

A contributor to the "Scientific American" describes the photographic test employed by a munition firm in the United States for the control of the time-fuses of shrapnel and other shells (p. 203).

The drawbacks attached to a large and fine screw-thread for the coupling of condenser cells are such as should engage the notice of makers of optical lanterns. Other devices are mechanically better and are adaptable to the special requirements of the condenser in a lantern. This question is one of many in the construction of apparatus which, it is hoped, will not escape the serious attention of manufacturers in their measures to produce goods of the best possible design (p. 202).

An American writer has issued a volume showing by photographs and specifications the construction of seventeen different makes of between-lens shutter (p. 202).

The present shortage of potass bromide, which is serious enough to threaten photography at its source, namely, emulsion-making, may be largely offset by photographers using sodium instead of potassium bromide in developers, and for the sepia bleach (p. 201).

The report of the Croydon Camera Club contains, for once in a way, an item of useful information—namely, a method of readily obtaining a regulated amount of diffusion in prints from sharply defined negatives (p. 206)

Addresses of the Reception Depots at which application for enlistment for the Photographic Section of the Royal Air Force may be made will be found on page 207.

A method for the waterproof spotting of enlargements, by which much waste of spotting work may be avoided, is the subject of a note on page 205.

We regret to record the death of a British photographic experimenter, Mr. R. P. Gregson, and of a prominent member of French photographic circles, M. A. Londe (p. 204).

The practical aid which a knowledge of drawing can render to the retoucher, finisher, and colourist in photographic establishments is the subject of a contribution to "Assistants' Notes" (p. 205).

The protective coating for dishes to be used in development requires to be one which is not affected by alkali. Shellac is unsuitable on this account; asphalt varnish containing a little rubber is best on the whole (p. 202).

"Colour Photography Supplement."

The wider recognition of good colouring of photographs and a correspondingly pessimistic view of real colour photography are the themes of some notes by Mr. C. Welborne Piper (p. 17).

The current instalment of the "Decennia Practica" of colour photography contains notes on the making of copies of and prints from Autochrome transparencies; also the first portion of a review of processes for the production of colour-screen plates which have been the subject of patent protection (p. 18).

EX CATHEDRA.

Bromide Economy. One of the essential materials in photography of which there is now a real shortage, which may become serious, is potassium bromide, a substance which, apart from its medicinal uses, is a necessary chemical in emulsion making. Fortunately, photographers, in their use of bromide in developers and of the larger quantities employed in sulphide-toning, can practise economy, and at the same time keep money in their pockets. This they can do by using sodium bromide instead of the potassium salt. The price of the former at the present time is just about half that of the latter, whilst sodium bromide, used weight for weight as a substitute for the potassium salt, is the cause of no discoverable difference, either in the use of bromide as a restrainer in developers, or as the companion chemical of ferricyanide in the bleach for sulphide-toning. We have convinced ourselves of the entirely satisfactory results with which the one bromide salt can be replaced by the other for both of these purposes. Apparently nothing but prejudice has hitherto stood in the way of the general adoption of sodium bromide, the commercial form of which is not of the crystalline form of potass. bromide, but is usually a powder. Nevertheless, there need not be the slightest hesitation in ordering and using soda bromide, and thus releasing an equivalent quantity of potass. bromide for more essential purposes.

* * *

Running One-Man Businesses. Some time ago we suggested that photographers would be wise to consider the possible methods of keeping one-man businesses open while the proprietors were serving their country. We pointed out also that if they wished to claim the status of professional men, they might very properly enter into such a scheme, seeing that it is an understood thing in many professions that one man shall carry on another's business for him, if necessary, during his enforced absence. In photography, with its very various standards of output, the difficulties are many, yet instances will be found in which a little good-will should effect their solution. Where circumstances so direct, we think the most satisfactory course will be to run two or more businesses as one, rather than to keep all going separately. The latter plan would be practicable (and necessary) only when businesses differed enormously in status. Clearly, it is necessary for the photographers themselves to take the matter up in every town and district, and we would suggest that they will find their task much simplified if they make up their minds at the start to recognise two most vital facts. First, that in no case will there be anything like the number of exemptions granted that have been in the past; and, second, those who have been in the habit of doing so must cease to look upon other photoraphers as trade rivals engaged in throat-cutting competition. For the time being, at any rate, all must cease to be rival traders and become and act as brother profesionals, whatever their own ideas on the subject of trade or profession may be.

* * *

Pinhole Power. A writer of an article on pinhole photography in a contemporary recommends for the calculation of exposure "what is known as the Watkins power system." It may be so known to him, but most people recognise in the hyphenated designation Watkins-Power the share in its origination of that enthusiastic amateur photographer Dr. D'Arcy Power, to whom photography is indebted for many contributions to practical photographic processes. Accession to power is commonly regarded as a distinction. The writer on pinhole photography has perverted it into the reverse. We can imagine, however, that our friends of San Francisco and Hereford, who are thus joined in the naïve error of our contemporary's contributor, will smile to themselves, and will, perhaps, call to their recollection a similar instance of the danger of a little knowledge which provided the occasion for a laugh a few years ago. That was when the late Mr. Hector Maclean, mis-hearing a reference to the Purkinje effect at an R.P.S. lecture, subsequently delighted certain technicians by some solemn remarks in print on "the well-known Perkins phenomenon."

* * *

Shutter Mechanisms. Only a few days ago we were examining a piece of characteristic American organisation literature in the shape of a volume issued by the United States Armoury for the technical assistance of makers of munitions. It specifies in the utmost detail the ninety-two separate parts which enter into the construction of the machine-gun, and itemises the precise shop directions which are necessary for turning out each of them. Just while we were admiring the perfection of this work and were inclined to regret that photography did not offer similar opportunities, we came across a mention of a piece of technical literature which has much in common with the official help which the U.S. Government is rendering to the munition makers. This is a volume of descriptions and enlarged photographs of the working mechanism of the seventeen patterns of between-lens shutters on the American market. It is the work of William O. Hammer, and has been compiled as an assistance to the overhauling and repair of shutters of this somewhat delicate type. We read that important parts are numbered in the photographs and directions given for separating and reclosing the shutter. There can be no doubt that the work will be of great value to manufacturers and dealers in this country, not only as a guide to possible causes of derangement of shutters, but still more as facilitating a comparison of the technical merits of the different types of this piece of apparatus.

* * *

Dishes for Enlarging. In common with most other manufactured articles, porcelain and enamelled dishes are becoming scarce in the market, and photographers must turn their attention to substitutes made of wood, glass, or paper. The methods of making such dishes have been given from time to time so that they need not be recapitulated here, the object of this note being only to draw attention to the very important question of the protective coating to be applied to the surface. One of the favourite varnishes for dish making is shellac dissolved in alcohol; this answers well for nitrate of silver solutions and most other purposes in wet collodion work, but when alkaline solutions have to be used it is quite useless, becoming rapidly reduced to a pasty condition by cold solutions and becoming quite liquid in warm ones. Hence, we may use a shellac-coated dish for amidol developer but not for any developer containing soda or potash, either caustic or as a carbonate. The same applies in a lesser degree to so-called enamels, such as bath enamel or ordinary paint. Leather cloths or marbled table covering are quickly disintegrated by alkalies, the surface becoming powdery and leaving the fabric. Asphalt varnish to which a little india-rubber solution has been added makes a reliable coating which suits both acids and alkalies, and ordinary gas tar which has been diluted with an equal bulk of mineral naphtha immediately before using does equally well. Both of these varnishes require a few days to dry. The cleanest and most satisfactory method is to make the dish, developing or fixing tank of clean white pine, free from knots, and to saturate it with paraffin wax. The wax must not be allowed to form a coating, but must be ironed in with a warm laundry iron until it is quite absorbed by the fibre of the wood, and this process should be repeated when the surface gets at all rough. The outside as well as the inside should be treated, or the wood will soon be rotted by standing in the sink.

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THE MOUNTING OF CONDENSER LENSES IN LANTERNS.

The suggestion of a fastening of the bayonet-catch pattern for the elements of a condenser cell, which was made recently by a correspondent, is, of course, a very old one, to which, however, designers of optical lanterns may well pay more attention than they have. There has been too great a desire to preserve the screw-thread method of coupling. Fine-threaded screws on a large mount are not at all easy to put together, and if a bad start is made the threads are readily damaged, which makes the problem worse than ever. We have referred here to lanterns of twenty-five years ago; but almost identically the same patterns, with the same defects, and presenting the same annoying trivial difficulties, are on the market to-day: and when we do come across a better pattern, in which these small details have been thought out and improved upon, we find much too frequently that it is either an American or German production, or is founded upon foreign designs. If the future of our manufacturers is to be as prosperous as we all hope it will be, it will be necessary to abandon the old English fashion of sticking to one particular standard pattern, in spite of its various defects: instead of waiting to see foreigners put new ideas into practical shape we need to be first with the new ideas as well as first in the quality of workmanship. Neglect of fresh designing, and of suggestions put forward by practical users, will not pay in the future, though it has been far too much of a custom in this country in the past.

The drawbacks of the condenser screws could very easily be remedied without any complications. In fact, we believe that a much cheaper mode of construction would meet the case admirably. We may say at once that, while the bayonet-catch idea is considerably better than the screw, it is not necessarly ideal, for if the fitting is tight it is sometimes nearly as difficult to release the catches as it is to move a screw. We suggest the following idea as well worth consideration. It is not necessary in a condenser to have everything rigid; in fact, a little play is desirable for the lenses, in view of the fact that they are subjected to great heat. One of the simplest means of fixing a lens in a flanged mount is by means of a stiff spring ring, cut so that it can be sprung into the mount and pushed up close to the lens. Such a ring on the lantern side of a condenser might lose its springiness by being so strongly heated, but on the other side it would not incur that risk. If, then, the tube mount has a slight flange at the lantern end, one lens can be put in from the front and pushed up to the flange. A loosely fitting separating ring can then be dropped in, and on top of this the second or front lens. If the spring ring is then inserted after this lens, everything is fixed as securely as needed, while at any time the simple removal of the spring ring will enable us to empty out the three items which are in the condenser mount.

An alternative method, which might be somewhat safer for a very large condenser, is to replace the spring ring by a flange cap fitted on with bayonet-catches. The lens separator inside the mount may also be a spiral spring instead of a solid ring, and this is somewhat better for ventilation purposes. Here, again, we come to an important point—that of ventilation. It takes a long time for condensed moisture to get out of a condenser if there are no ventilation holes in the mount, yet many condensers have no such holes, while some which have them are supplied for use in lanterns in which the whole condenser is enclosed in an outer tube which effectually blocks up the holes. In a very excellent type of lantern, which we are sorry to say is not of English design or make, the condenser simply drops into a cradle, which holds it in the right position. It can be lifted out without the slightest trouble at any moment, even when the lantern is in use, and the arrangement is as perfect and convenient as possible. It offers the greatest possible contrast to some English optical lanterns, in which the removal of the condenser involves, first, taking away the lamp, and then the withdrawal of the condenser through the body of the lantern.

We have here mentioned two points that most urgently need reconstruction and re-design, viz., the mounting of the lenses in the condenser and the mounting of the condenser in the lantern; but there is another with regard to lens-mounting generally which is worth notice. A short time ago a contributor to "Assistants' Notes" referred to the difficulty often experienced in getting lens bezels out of lens mounts. His method was to turn a wood plug that would fit tightly into the bezel ring, but there need be no difficulty at all if the bezel ring is only made so as to facilitate removal. As a rule, it is milled on the edge, but so finely that the milling affords no grip. Coarser milling will help matters, and with a deep saw-tooth milling it is only necessary to press the edge of the ring on a piece of soft wood and then turn the mount so as to unscrew it from the ring. There are objections, however, to such deep milling, one being that it is easy to cut the fingers upon it; and a much better and simpler method is to make two simple square nicks on opposite sides of the ring. It can then be turned easily by putting the edge of a steel rule or that of an old knife in the nicks, using this instrument as a cross-handle. Some few makers provide such nicks, we believe, but we have generally found it necessary to make them ourselves with a small file or a fret-saw.

Though we have mentioned that foreign makers have too often led the way in improved details of apparatus, it by no means follows that their innovations are always the best possible devices. To take an example, one old familiar trouble has been the screwing of ordinary camera lenses into their flanges, big lenses being especially a nuisance in this respect. The real fault here was the use of too fine a screw thread, and the best remedy was the one adopted by Messrs. Taylor, Taylor, and Hobson of using a coarse well-designed thread. On the other hand, German makers tried the expedient of using interrupted screws, possibly taking the idea from the use of screws of this pattern in gun breeches. With such a screw the lens is simply pushed into the flange and given a quarter-turn, which fixes it. At first the idea seems excellent, but on second thoughts it is realised that only a reverse quarter-turn is needed to fetch the lens out again, and if the camera is being carried about, perhaps over rough places, it is by no means impossible for the lens to shake loose and drop out. Another idea from abroad is that of causing the flange to form part of the lens-mount, and fixing it to the camera front by studs working on the bayonet-catch principle. This is not so satisfactory as it looks at first sight to be, because it is essential that the lens should be quite rigid when in use, and to fulfil this condition the studs must fit the flange so tightly that it becomes difficult to remove the lens at all. Further than this, if the fitting is not tight enough, the lens may shake loose and drop off. We have had experience of this type of mounting on a lantern front, and in this case it is perfectly effective in holding the lens, though, as the latter is quite immovable, the special convenience of the arrangement is not very apparent. Such examples, good and bad, should suffice to emphasise the fact that there are numberless openings for improvements in apparatus, and that manufacturers would be well advised to give special attention in the immediate future to the matter of design, and to employ experts for that purpose alone.

TIMING SHRAPNEL WITH THE CAMERA.

In the following article, which we reprint from the "Scientific American," the writer describes a simple photographic method of testing the time fuses of shrapnel and other explosive shells adopted by a New Jersey munition firm for the sake of its greater accuracy in comparison with the use of stop watches.—Eds., "B.J."]

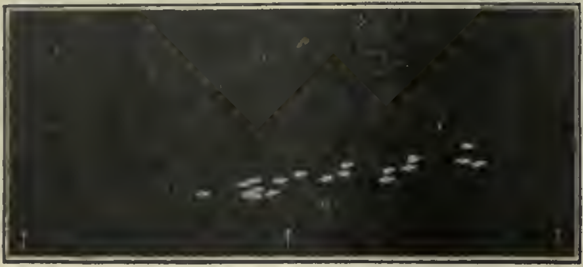
The beginning of the testing of 3,000,000 three-inch shrapnel and high explosive shells for the Russian Government early in 1916, on the Proving Grounds of the Eddystone Ammunition Corporation at Lakehurst, N.J., which was in charge of Capt. C. K. Rockwell, U.S. Army, retired, marked the opening of a new field, in which photography was put to a new use in the United States.

Prior to 1916 the accuracy with which artillery shells were exploded by time fuses had been determined by timing the shells with stop watches from the instant they left the gun until they burst, with more or less accuracy, at the point determined by the setting of the fuse. Innumerable tests by stop watches, both here and abroad, had established the fact that the results obtained were not absolutely accurate, and that there was room for improvement in testing methods.

For the purpose of obtaining more accurate and scientific data upon which to base their measurements and computations in determining the average deviation of a given number of shells, the Eddystone Corporation inaugurated the new system of testing time fuses, which forms the subject of the present article.

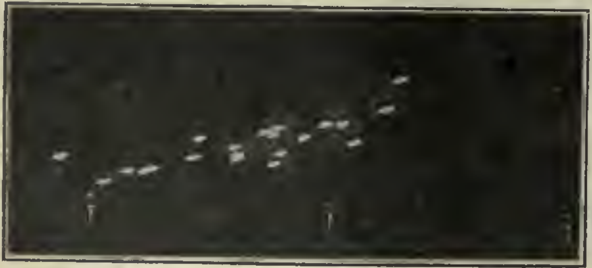
The distances from the firing point to the point on the range over which the shells were timed to explode was marked by a short post. At night a light was hung on this post. On either side of this post, at a distance of 350 feet along the line of fire was a similar post, each having a light hung upon it in the same manner. These lights were about six feet from the ground. A few minutes before the firing began (at night) the company's photographer was despatched down the range with a camera. Upon the photographer arriving opposite the centre light he would turn and ride at right angles until he reached a bombproof situated 1,500 ft. south of the line of fire. He would enter and set up his camera, within the bombproof, focussing his instrument so that he had the centre light referred to in the foregoing on the centre of the plate. This being done he would telephone to the officer in charge of the firing that he was ready to photograph the burst of each shell.

For the convenience and to meet with the desires of the Russian artillery officers the distances on the range were computed in Russian measurements. The distances at which the shells were timed to explode were as follows:—Two versts (7,000 feet), three versts (10,500 feet), four versts (14,000 feet), five versts (17,500 feet).


Burst at 10,500 ft.

Each of these points, or desired bursting areas, was marked by three lighted posts, the centre light marking the exact measurement from the gun.

Having telephoned the officer in charge of the night firing that the camera was ready, the photographer left the plate in the camera exposed until all shells timed to explode at that point had been fired. As the shells burst opposite the camera their flash was immediately photographed on the plate. The flashes of the ten shots were thus recorded on the plate, together with the three fixed lights.


Burst at 14,000 ft.

By keeping a record of the setting of a given number of time fuses it was possible, by measuring the distance from the centre light to each shot, to get the average deviation of a given number of shells.

Testing ammunition by daylight on the Eddystone Range also had its interesting features. If a shell failed to explode after being fired, shell scouts, whose duty it was to recover these shells, were sent down the range, after firing had ceased, to recover all unexploded shells. The recovered shells were placed in a steel pit and exploded electrically. By this method they were enabled to determine what feature of the shell was defective.

At the bottom of the bursting pit there is a small iron door, and just before the shell in the pit is fired this door is opened, so that when the shell is exploded the shrapnel and other contents of the shell are hurled through the door. This relieves the pit of a considerable portion of the force of the explosion and prevents ultimate congestion of the pit.

John W. Havens.

DEATH OF MR. R. P. GREGSON.

We are sorry to notice in the Lancashire papers the death, on April 18 last, of Mr. R. P. Gregson, formerly a photographer at Blackburn and Lytham, who for some years past had had his residence at Staveley, Westmorland. Mr. Gregson was originally an amateur photographer, who afterwards took up photography professionally, and later on gave up the business of studio portraiture in order to devote himself to the manufacture of a new description of self-toning printing paper which he had invented. This was the "Yto" paper, manufactured until a few years ago by a firm of the title of Anytone, Ltd., and since then among the productions of Messrs. Kentmere, Ltd., with whom Mr. Gregson was associated at this firm's Staveley factory. In "Yto" paper, apparently, Mr. Gregson had realised the desideratum of a print-out paper which does not contain "free silver,' a characteristic which explains its remarkable keeping qualities and freedom from discolouration on storage. Its inventor will be remembered as a most enthusiastic photographic experimenter by those who witnessed a demonstration of the paper some years ago at the Royal Photographic Society, of which Mr. Gregson became a member in 1894, and was elected a Fellow in the following year. In his death, at the age of sixty-four, photography loses a valued worker in the experimental field, whilst Mr. Gregson will also be missed in the football world of the North of England, in which he took a very leading part as referee and as a pioneer in the organisation of the scheme for the English Cup competition.

DEATH OF M. A. LONDE.

One of the best-known figures in French photographic circles has been removed by the death of M. Albert Londe, formerly head of the photographic department of the Salpêtrière Hospital, with which he had been connected from the time when he entered the service of its laboratory as a lad. In the early days of the dry-plate process M. Londe was a prolific inventor of apparatus in the shape of shutters, etc., by which the facilities of the new process could be better turned to advantage in medical photography. He was also a pioneer in the use of artificial light from magnesium powders, and, on the invention of the X-rays, installed the first radiographic department in the Paris hospitals. His published works extend to some half-dozen volumes, notable among which are his text-books on medical photography, instantaneous photography, and the magnesium light.

Doncaster Camera Club.—All communications for the secretary should be addressed to Mr. G. L. Sutcliffe, 44, Mutual Street, Doncaster.

Optical Research.—As announced in an official advertisement, application has been made to the Board of Trade for a licence directing an association about to be formed under the name of "The British Scientific Instrument Research Association" to be registered with limited liability without the addition of the word "Limited" to its name. The objects for which the association is proposed to be established are "to promote research and other scientific work in connection with the British optical and scientific instrument trade or industry, and for that purpose to establish, form, equip and maintain laboratories, workshops or factories, and conduct and carry on experiments and to provide funds for such work, and for payment to any person or persons, whether members or associates of the association or otherwise, engaged in research work, whether in such laboratories or elsewhere."

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

The Uses of Drawing to Assistants.

SOME correspondence which passed in the "B.J." a while ago seems to me calculated to give assistants the idea that drawing is of little or no value to them, and its acquirement hardly worth wasting time on. I do not think that this view is at all a right one. At the same time, the actual uses of drawing are perhaps a little obscure, and I will try to point out where they really do come in.

First, perhaps, one ought to mention freehand. This trains the hand both to exactness and the sweeping use of the pencil—and in reality brush also—and is of great use to teach broad work and broad touches in such tasks as laying in washes to form curved masses of hair, drapery, etc., from copies where the lines of the original have to be followed and perhaps strengthened, both by hand or air brush or both. Cheap enlargements are nearly always more or less defective in this respect where fidelity to the original is really the first consideration.

Next, model drawing. The purpose and intention of this branch of the art is to teach one how to represent things as they appear, both to the eye, and, incidentally, to the eye of the camera (the lens) also, for we know the old saying that "things are not always what they seem," and though we may be quite sure that a pedestal or box *has* got four sides, we don't see them all at once, nor does the camera. Therefore, we only draw one, two, or three sides as the case may be, just what we see in fact, but our knowledge leads our fingers astray unless we are taught. Perspective, geometry, and projection work also serve more or less this purpose, and for those who put in either large or small sketch backgrounds this knowledge is of great value, and would save many a print going out with a ridiculously incorrect background. Indeed, many of the backgrounds sold to photographers are great sinners (I have to use one, and it always annoys my eye), although otherwise quite excellent. Interiors and pillars are the worst of this kind, while many backgrounds are quite devoid of the proper "middle distance" so necessary in scenic effects to produce the results aimed at. An artistic sitter cannot fail to notice these things, and it does harm to the status of both the photographer and his assistants.

"Light and shade" and "shading" are just as necessary, and, indeed, taken along with so-called "posing" go to form the most important ingredients of a good photograph, and it is in these things alone that the difference often lies between the work of a so-called "artistic and high-class" photographer and a middle-class one, for the technical work of one is usually quite as good as the other. The retoucher and finisher also need this knowledge, for it is defects in this light-and-shade mass that they are chiefly called to rectify, and the more intelligently they do it, the better and more successful is their work, while they will direct it more certainly and finish it more quickly as they are well versed in the drawing of actual light and shade effects. A few little extra touches of high light and deep shadow will often make a world of difference to an otherwise flattish enlargement or print.

Drawing from the cast naturally leads to figure drawing, and that is often, if not always, the bedrock from which good posing comes. It includes balance and composition in handling limbs and draperies, etc., and there is a subtle something about a well-posed figure which, though often difficult to define, always conveys a feeling of satisfaction to the eye. A course of figure-drawing also teaches the varying effects of foreshortening, a matter with which the camera-man is much concerned, for the camera also foreshortens, and sometimes, if clumsily used, in the wrong place. It is surprising what a good servant or a bad master a camera can be. Standpoints, points of view, height and tilt, all these we know have their effect on the sitter's portrait, but the important thing is to know what should be aimed at and what avoided, and this figure drawing will invariably teach, and inasmuch as your drawing is made line by line, instead of by a simple exposure, the lesson gets home, and sticks, and you realise to what the lines lead. Also you will learn where to look for distortion in your negatives or prints, and how to correct or avoid it—the too large nose, ear or hand; the awkward turn of the head, that also distorts the neck; and those troublesome, but necessary, members, the feet. Whether you operate or retouch or finish, or work up enlargements, all this knowledge will stand you in good stead, and its result will mark out your work, almost unconsciously sometimes or to some photographers, as being "good," and cause it to be in demand.

Then, again, there is the study of colours, and how to use them. Colours are a law unto themselves, and their harmony is part of this law. There are rules which *ought* to be known to all who use them, but I much fear they are not always known, or we should not see the clashing mixtures of opposing colours which in the backgrounds often spoil an otherwise excellent coloured photograph. A mere taste for the use of colours and brushes, and some aptitude in their use seems often to be considered all the training a colourist needs, with the appalling results often to be seen in photographers' windows, really more likely to drive away the custom of an artistic sitter than bring him or her into the reception-room. One who joins knowledge of figure-drawing to knowledge of colour using will seldom get prints or miniatures returned for alterations to eyes, nose or mouth, and just because their *colour drawing* is correct in the first place. They know what the shape of nose or mouth should be, and draw with their colours accordingly. And nine times out of ten, alterations to coloured work lead to its being more or less spoiled.

Unfortunately, one result of the war has been in a great many small places to put a stop to art and drawing classes. This is a great pity, but not an insurmountable obstacle. There is, I believe, a good book on drawing published by the publishers of the "B.J." Second-hand books on drawing, etc., can also be obtained from Messrs. Foyle, of Charing Cross Road, London, at quite moderate prices (from others, doubtless, but my dealings have been restricted to this firm), and there is at least one Correspondence College which is so thorough in its methods that it even furnishes the necessary drawing instruments and material to its students, and also plaster casts, etc., to work from (for obvious reasons I mention no name, I can send it with pleasure to anyone interested), so that even though living in small and isolated districts, good teaching is easily available to anyone who realises its worth sufficiently to want it, and, after all, critics or no critics, art *is* the real foundation, and was the first inspiration of photography as we know it. Sometimes we read in the "B.J." explosions on the subject of "Assistants' Unions." Well, I think one of the most sensible unions they could form would be one for circulating portfolios of their work, operating, drawing, and so on, for criticism and comment among themselves only, for this would be bound to lead to real good and benefit to one and all, and also to the uplifting (so much and often talked of) of the photographic art, for be it remembered that the assistant of to-day is the employer of to-morrow in most cases, and it is just by little and by little that we all learn. Personally I owe more to the kindly criticisms of my work, both operating and other branches, and suggestions, of a certain elderly and genial F.R.P.S. in my present town than to reams of high-flown talk about "standings of the profession," and so forth, and I often wonder why assistants do not try this method of benefiting themselves. It is in common use among members of postal camera clubs. Anyway, why not try it?—G.E.H.G.

Waterproof Spotting of Enlargements.

THOSE who do not possess an aerograph and wish to move with the present colour wave will find the use of Indian ink, or a dye, useful for spotting purposes in preventing "lifting" on bromide paper. If ordinary water-colour or a pencil is used and a wash applied the spotting dissolves, wasting the time spent.

With a drop of water varnish, water-colour medium, or gum water mix Indian ink or water black and a little scarlet dye (to make it more or less brownish, to match print) into a paste. About as much as will cover a fly's wing is all that is required. With this the artist has an intense dark to start with, thinning down to tint required.

If the spotting on an enlargement is fixed one has more confidence in applying an ordinary wash of water-colour, because if it is not satisfactory it can be sponged off; part of the work (spotting), at any rate, is not wasted time, and is a consideration, especially if the enlargement is from a negative that has been considerably retouched.

A more even finish is got if the spotting is done first, because the film of colour helps to hide the work, whereas if the spotting is done last extra work is entailed in matching the colour required, and is liable to show patchy as the touches of colour differ in containing more or less gum or body colour. As all enlargements displayed are not framed, and get dusty and marked, soft india rubber is in request to clean the mounts. Unfortunately, if applied to ordinary spotting or aerograph work it rubs it off, but if a dye had been used the faces of the prints could have been freshened with a moist sponge.—BURLINGTON.

Assistants' Postcard Paragraphs.

A SOLVENT FOR MASKLENE OPAQUE.—Having used the Aerograph Company's "Masklene" for the purpose of blocking out figures from groups on the original print, as a protection, while aerographing in background, and having been unable to get a supply of benzole (or benzine) for the removal of this protecting coat, the process has been brought to a standstill in the absence of this solvent or a substitute. Nothing could be recommended, but on finally trying a little naphtha it was found to answer the same purpose well. This spirit, as may be generally known, is excellent in making varnish with shellac instead of the spirits of wine when supply is exhausted.—M.B.

New Books.

"The Happy Hospital." By Ward Muir. London: Simpkin, Marshall, Hamilton, and Kent, Ltd. 1s. 6d. net.

WE enjoy anything of Mr. Ward Muir's for its writing. His precision in words is a delight to the reader, his tincture of the satiric temperament of the Scot saves him from ever being dull, and his experiences as a hospital orderly during the war have had the fortunate result of introducing us to a strain of cheerful tenderness in him which we did not recognise before. In the present volume, which is a set of fourteen sketches of the life he has seen in the 3rd London General Hospital, he has gathered impressions which are very real. They are too novel, as his publishers thoughtfully insist, to have been invented by an outsider. Certainly they provide the most intimate glimpses into the doings of staff as well as of patients, in the wards in Wandsworth, which are a living part of the British armies.

Naturally the soldier in hospital is in the foreground of these chapters, and the picture of him is one which can be accepted as true to life. A less conscientious student of human nature could easily have misdrawn it in the key of the pathetic. It is Mr. Ward Muir's saving grace that he responds to the grim commonsense, the acceptance of things as they are, of the wounded who have come under his care. And his intuition leads him to draw portraits which are instructively felt to be true and, for all their cheerfulness, leave a thoroughly wholesome disgust of the cause of the multifarious horrors through which his fellows have had to pass. In the days when the war has ended his pages will be preserved as a faithful picture of one phase of it, the work of a discerning and sympathetic chronicler.

FORTHCOMING EXHIBITIONS.

April 18 to May 17.—Hampshire House, Hammersmith, Photographic Society. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12.

THE LIGHTING ORDER.—At the Borough Police Court last week a photographer named Ada Delicate, of 55, New Street, S.E., was fined 10s. under the Lighting, Heating and Power Order of March 18.

HIGH-CLASS SECOND-HAND APPARATUS.—Mr. Robert Ballantine, 99, St. Vincent Street, Glasgow, whose specialty in the second-hand business is his personal examination and guarantee of goods, sends us a 16-page list, just issued, of many attractive offers in cameras and lenses. The list is sent free on application.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, MAY 6.

City of London and Cripplegate Photographic Society. "Round about Grasmere." F. Hampherson. "Nicholas and Napoleon." B. C. Wickison.

TUESDAY, MAY 7.

Royal Photographic Society. "By Rail to the Land of the Midnight Sun." W. Sanderson, J.P.

Sheffield Photographic Society. "Ely Cathedral." H. S. Nutt.

WEDNESDAY, MAY 8.

Croydon Camera Club. "Curiosities Seen Through the Microscope." G Ardaseer.

Photo-Micrographic Society. Annual General Meeting, Exhibition, etc.

THURSDAY, MAY 9.

Hammersmith (Hampshire House) Photographic Society. "Among the Kiddies." W. E. Walker.

ROYAL PHOTOGRAPHIC SOCIETY.

MEETING held Tuesday, April 30, Mr. J. W. Lumb in the chair.

A lantern lecture by Mr. G. Avenell entitled "West of England Notes" proved to be an interesting discourse, enlivened with touches of humour, on the country of the Quantock hills and in particular on its associations with the early days of Southey and Coleridge and, subsequently, of Wordsworth. Mr. Avenell drew upon material of literary interest in his notes of the Lake poets at the time of their residence in the West of England and his photographs added to the relish of these personal glimpses.

The thanks of the meeting were accorded to him by acclamation.

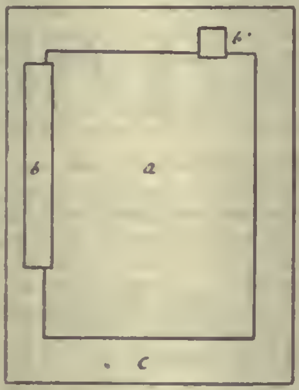
CROYDON CAMERA CLUB.

LAST week there was a display of prints from negatives taken on the Easter Monday outing to the neighbourhood of Reigate, a locality almost the copyright of the club, and again selected as being off the main line. Mr. E. A. Salt secured the medal for the best picture of the day.

Lately, that usually enthusiastic bromoilist, Mr. J. Keane, has waxed exceedingly sorrowful on having discovered there is a dreadful amount of monotony in photographic art. If he goes on cultivating his powers of observation in this remarkable way he will alight on such interesting facts as there being a moon in the sky, and occasionally less desirable heavenly objects closer to the earth; not to mention that Queen Anne is dead, and so forth. A kindly member has endeavoured to cheer him up by pointing out that neither Nature in her multitudinous moods nor the camera is at fault, the trouble being due to the poverty of mind and frugal conception of the photographer; but the ex-President refuses to be comforted.

During the evening Mr. Salt showed a simple method of introducing a regulated amount of diffusion into prints from sharply defined negatives. The idea, he said, was old, but the way of carrying it into effect might be new. Anyway, it was new to those present, and may be so to others, a point in its favour being that it has received the gracious approval of Mr. H. P. C. Harpur, a specialist in the out-of-focus business. The method consists in partly printing in the usual way, and then giving a further exposure with a piece of thin glass interposed between the negative and the printing paper, a simple method of registration being adopted.

In the diagram a is the negative fastened by gummed strips of paper on the glass side to the cut-out cardboard carrier c, which must be of approximately the same thickness as the negative. Both are inserted in a printing frame fitted with a glass front. On the carrier a strip of cardboard b, and a cardboard stop b^1, are fixed with "Mendine" or similar adhesive, and allowed to lap slightly over the film of the negative as shown. The printing paper is adjusted to the negative in contact with the edges b and b^1, and printed in the usual way for (say) four-fifths of the time necessary to secure a fully-printed image. The paper is backed with the usual rubber pad the size of the print, and also with a piece of cardboard behind it of the same substance as the card strip and stop, taking care that the two former do not lap over either of the latter, or bad contact between paper and negative will result. The paper is now removed and a sheet of thin glass (a cleaned-off negative answers well) is placed in the position occupied by it, and the paper again laid down in contact with the guide strip and stop as before. For this second registration obviously the card strip and stop must be thicker than the glass through which the remaining one-fifth of the exposure is given. In his case, printing being conducted by a mercury lamp, ground-glass was placed over the frame to diffuse the light. With daylight, probably this would not be necessary.



A straight print of a landscape subject with somewhat wiry, leafless trees was shown, and also another print (the medalled one) from the same negative, printed as above indicated The latter was of much finer quality, a pleasing softness of outline without loss of structure being secured. Portraits, he said, might be dealt with in the same way, and by varying the proportion of the first to the second printing any degree of diffusion was possible, and could be repeated with certainty if an actinometer (preferably of single-tint type) was employed

Commercial & Legal Intelligence.

NEW COMPANIES.

Art and Humour Publishing Co., Ltd.—This private company was registered on April 23, with a capital of £5,000, in £1 shares, to carry on the business of manufacturers of and dealers in picture postcards, calendars, festive and fancy cards, pictures, prints, etchings, photographs, films, advertising media of all kinds, books, music and albums, etc. The subscribers (each with one share) are :—F. H. Pepper, 34, Waterloo Street, Birmingham, solicitor; J. E. Smith, 78, Springfield Road, King's Heath, Birmingham, cashier The first directors are to be appointed by the subscribers. Registered office, 27, Chancery Lane, W.C.

News and Notes.

German Luxury Tax—According to the German newspapers photographic apparatus of any kind is to be the subject of extra taxation, viz., at the rate of 10 instead of 5 per cent. upon retail transactions.

The War Photographs.—The exhibition of battle photographs in colour at the Grafton Galleries, which closed last Saturday, will be transferred to the People's Palace, Mile End, and opened there on Monday, May 6.

Messrs. Ross, Ltd., announce that they have removed their retail branch to 13-14, Great Castle Street, W.1, formerly occupied by Carl Zeiss, Ltd., the business of which firm, as announced some months ago, has been purchased by them.

Nicholas and Napoleon.—The entertaining lantern lecture by Mr. B. C. Wickison, which was delivered at the R.P.S. a few weeks ago, is the feature at the City of London and Cripplegate Society on Monday next, May 6, at 7.30, when any visitors will be welcomed.

A Programme-Souvenir of performances of the Savoy opera "Princess Ida" by the Leicester Amateur Dramatic Society, which are being given next week in aid of local charities, is the production of Mr. J. Ramsden, whose many photographs of the cast will certainly be prized by both performers and audiences.

Home Portraiture.—Mr. Charles F. Rice, writing in the current issue of "American Photography," refers to his experience in the use of plates, large and small, in home portraiture work. Of results made from negatives ranging from 7 x 5 to vest-pocket, the highest percentage of successes have been on the smaller plates.

Metol Skin Poisoning.—Sufferers from developer skin poisoning may be advised to note the exceptional offer of the Ujah Ointment Company made in our advertisement pages this week, viz., to send free a 2s. 9d. jar of their preparation to any sufferer who will report on its effect on the expiry of ten days' treatment. This special offer remains open only until next Friday, May 10.

Economy in Bromide Printing.—Photographers who make all their bromide prints by hand would do well to take as a model the working of a modern mechanical exposing, developing, fixing, and washing machine, such as used by the large publishing firms. Here we have a definite time for exposure, definite time for development, fixing, and washing, and, what is most significant, movement all the time.—Rajar "Trade Notes."

Ensign Goods.—Messrs. Houghtons, Ltd., 88-89, High Holborn, London, have just issued an abridged catalogue of Ensign cameras and accessories, which, in a neat and attractive form, presents the articles ordinarily in demand among amateurs. The list embodies price changes which have come into operation within the past twelve months, although, as is pointed out, the unsettled condition of the market renders these figures subject to revision without notice.

The Photo-Micrographic Society.—The annual general meeting will be held on Wednesday, May 8, at 7 p.m., at King's College Bacteriological Laboratories, 62, Chandos Street, W.C. There will be an exhibition of members' work, etc., and the lantern slides entered for the 1917-18 competition for the Barnard Medal will be shown and the medal presented. Visitors are invited, and cards of invitation may be obtained from the hon. sec., J. G. Bradbury, 1, Hogarth Hill, Finchley Road, Hendon, N.W.4.

Prohibition of Photography.—At Worthing last week Stanley Towse, an architect, of Old Cottage, Tyler's Green, Haywards Heath, was summoned for taking a photograph in Sompting Road, Worthing. For the defendant, it was stated that he proposed to submit himself for election to the Fellowship of the Institute of Architects. For that purpose it was necessary for him to send drawings and photographs of executed work. Defendant was not aware it was a prohibited area. A fine of £1 was imposed.

Enlistment in Royal Air Force.—In reply to an enquiry, we are informed by the Air Ministry that applications for enlistment in the Photographic Section of the Royal Air Force can be made to the Officer Commanding at any of the Reception Depôts named below, according to the locality of the applicant :—40, Upper Brook Street, Mayfair, London, W.; 8, Tyndall's Park Road, Bristol; 12, Newport Road, Cardiff; Carlton Chambers, 35, Paradise Street, Birmingham; King Street, Nottingham; 117, Mount Pleasant, Liverpool; The Mount, Springfield Mount, Leeds; 10, Sydenham Terrace, North Road, Newcastle-on-Tyne; 9, Somerset Place, Sauchiehall Street, Glasgow.

Nature Photographic Society.—Although recent times have not been favourable to the outdoor work of nature photography, the Nature Photographic Society has deserved well of its members in the measures it has taken to maintain and spread interest in its work. During the past year it has continued to circulate its portfolios, and has prepared a new set of 100 lantern slides, which, with the type-written notes accompanying them, provides an attractive means of filling a vacant date in a society syllabus. Applications for these slides should be sent to the hon. sec., Mr. H. Armytage Sanders, 26, Charing Cross Road, London, W.C.2. The publication of the society's journal is suspended, and no change will be made in the officers until members have again an opportunity of coming together.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

LENS.—It is apparently an old triplet but it is impossible to say more or value it since the name on it is not of a maker.

C. E. COATES.—If you wish to offer your book for sale in our pages it must be as an advertisement. The price is about right.

WET COLLODION.—If not of too old standing they will yield to rubbing with potass permanganate solution (with some sulphuric acid added)—say, 5 per cent. strength, followed by dipping in an acid fixing-bath. A rub with pumice-stone to start with will assist this process.

LUMIERE.—There is no doubt whatever that A1 would be the best for your chief purpose as we understand it, *i.e.*, heads of single figures. At *f*/3 or *f*/4 the 1-15th sec. should be practicable. For small groups, nothing to choose between the two.

GODFREY PERRY.—The table refers to the most rapid plates made. Ultra-speed emulsions are now somewhat faster than when it was drafted, but, on the whole, not sufficiently to halve the exposures. You may take film as roughly half the speed of the fastest plates. Impossible to reconcile makers' figures for plate-speeds, which for years past have been very indiscriminate.

P. P. CARD.—Your query was just too late for last week. Strictly speaking, it is an infringement, but there has never been a case in respect to it within our knowledge, and it is very doubtful if the ownership of the copyright could be determined. You need not have the slightest apprehension. At least one firm makes a speciality of canvassing for orders for copies of such notices.

J. PRESTON.—It is possible that your 2B lens is of the "ordinary" type, in which case it cannot be adjusted to give soft definition. If it is of the "Patent" type, you will find some notches on the back cell with a little pin to serve as pointer. To soften the definition you unscrew the notched cell, the notches showing quarter-turns. You may unscrew more than a complete turn if you wish.

CHAS. DUNCAN.—Anything is possible, broadly speaking, in the way of idiosyncrasy in skin poisoning, but we should not think it is the bleach: more likely the developer. We have heard of cases of amidol, though they are rare in comparison with metol. Try the following ointment:—Ichthyol, 10 grs.; lanoline, 40 grs.; boric acid, 40 grs.; vaseline, 30 grs.; or one or other of the preparations Sphagnol and Ujah, sold for the treatment of the affection. A whole list of remedies and preventives found effective by one and another of our readers appeared in the "B.J." of May 12, 1916, price 4½d., from our publishers.

W. T. S.—Assuming that both the focussing-screen frame and the dark-slide are brought tightly against the back of the camera when in use, a test for focus register is as follows:—Lay a thin, stiff bar across the focussing-screen frame (the side that faces the lens) and then thrust a wedge-shaped strip of stiff cardboard so that it is just stopped by the bar. Make a mark on the card at the point at which it touches the bar. Then repeat this process with the dark-slide, only laying the bar across the latter and inserting a plate in the usual way (withdrawing the shutter, of course). For the bar in this test a good stiff 12-in. rule with a chamfered edge is very suitable.

J. L. W.—The usual plan is to make a soft, in fact rather flat, positive transparency on a lantern or slow landscape plate, and from this to print a negative on a plate of the same kind. Some little experience is required to get a good reproduction of the quality of the original negative, the general tendency being to make a transparency which is too brilliant, too much like a lantern slide. Another very good method is to take a print on glossy P.O.P. of the right depth (that is, not over-printed as for toning) and to copy it in the camera on a slow landscape plate. If copying is done by artificial light the print, though still sensitive to light, will not come to any harm during the period of exposure. Where a number of negatives have to be made and where the operator is inexperienced in this branch of work, we should say that perhaps the latter method would be the more satisfactory.

D. E. R. H.—1. We should say by tank, for the reason that the elimination of the personal factor in judging density will give you on the average negatives which are more suitable for enlarging. But there is nothing against developing by dish, a convenient plan being to fix the tiny plates in one large dish with small dabs of Plasticine. 2. Preferably Azol or Rytol for negatives to be greatly enlarged. 3. As regards makers' formulæ, bromide is often included in the developer in order to counteract the tendency of the plate towards fog. It is only the best plates which will stand a developer without bromide. The case of the "B.J." pyro-soda is rather a special one because it is a somewhat slow and non-fogging formula of itself and if we gave it with bromide it would probably be unsuitable for the majority of plates. Still no doubt there are plates which require it with bromide, and that no doubt is why Messrs. Matthews give such a formula. 4. A magnifier of the Ramsden type with adjustable screw-eyepiece. 5. We should prefer a tank with detachable rack and the use of a separate tank for the fixing and washing of the plates. The Eastman tank is a very good one, but there is really not very much to choose among the different makes, and we daresay that there would be probably a difficulty in getting some of them just now. 6. No. We prefer to fix plates in a separate tank and to keep a tank only for development or for the wash after development.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of last week's "B. J.," by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less	1/-
Extra words	1d. per word.

(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

For words "Box No." and office address in adv't add 6d. per insertion.

For forwarding replies ... ... 6d. per insertion for each adv't.

If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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SUMMARY.

In a contributed article Mr. R. R. Rawkins describes exactly how to make a plate-marker for postcard strips which are printed three-on. The marker can be made at very little cost from card, and if constructed as described is very quickly and accurately used. The plate-mark on a portrait postcard gives a superior appearance, which justifies a better price. (P. 211.)

The economy of labour which results from having appliances arranged always ready for use is an item which is still insufficiently recognised in many photographic establishments. A lull in business cannot be better employed than in some reorganisation directed towards securing adequate working space. (P. 210.)

A most objectionable abuse of the legal right which a free-sitting photographer obtains is instanced by a correspondent. (P. 218.)

A new design of photometer for the measurement of densities is the joint work of Messrs. W. B. Ferguson, F. F. Renwick, and D. E. Benson. Its general features and some precautions in its use are the subject of short papers by the two first-named. Details and drawings (by Mr. Benson) of its construction are held over until next week. (P. 213.)

Methods of cutting masks for multiple exposures on a single plate in the camera are described and illustrated in a letter on page 219.

Mechanical methods of after-work on prints in the shape of spotting and other retouching, preparing for colouring, etc., were demonstrated at last week's meeting of the Croydon Camera Club. (P. 217.)

A modification of the shorthand methods for writing developer formulæ, put forward some months ago by Dr. Mees, is the subject of a suggestion by a correspondent. (P. 218.)

Hypo in prints, from incomplete washing after fixing, is a common cause of patches in sulphide toning. (P. 209.)

A suitable form of test object for working comparisons of lenses is the subject of an "Assistants' Note." (P. 215.)

A further advance in the price of half-tone and line blocks has been made by process engravers. (P. 212.)

A fine of £10 was inflicted on Tuesday last on each of the directors of a firm—a limited company—in respect to insufficient prominence of their names and their country of origin upon the firm's business stationery. (P. 218.)

Less bulky means of illumination seem to be a coming feature of optical and enlarging lanterns. (P. 210.)

Complete dryness of the paper of the print or of the image upon it (in the case of oil pigment prints) is a very necessary condition for successful dry-mounting. (P. 210.)

Disappointment in the use of panchromatic plates (writes a contributor) is perhaps mainly the result of developing them by an alleged "safelight." (P. 216.)

EX CATHEDRA.

Organised Ethics. It is interesting to note the intensive effect upon the spirit of nationalism which the war is having in America. We see it very strongly evidenced in the address delivered to a Baltimore convention of professional photographers by our good friend Pirie Macdonald, one of the livest and sanest personalities among portrait photographers in the United States. Mr. Macdonald sees in the vast concerted efforts which his country is making in the war an incentive to a similar coordination among the civilians who are grouped together in a given profession or business. And that train of thought leads him to put in a vigorous plea for a code of ethics which shall be so widely adopted by photographers that the black sheep in their ranks will be a negligible minority, and therefore the evils which assail photographers from quarters outside the profession will be exposed to opposition by a solidly compact organisation. There is much to be said for this view here as well as in America, for when a thing which harms the average photographer is probed to its source it is almost invariably found—necessarily it must be so—that a photographer is concerned in it. Mr. Macdonald is obviously an idealist, but he is a shrewd business man whose influence among his fellows in the United States carries great weight, and it may be hoped that the spirit which he is seeking to infuse into his brother professionals will bear fruit. A full representation, as he says, is the chief thing. A postmaster-general will listen to a society of 1,000 members, but a society of 10,000 members would be able to induce him to listen to reason.

* * *

Printing, Washing, and Sulphide Toning. We have noticed that some workers never seem to have any trouble with sepia toning, while others are always in a state of uncertainty as to how a batch of prints will turn out. There are many pitfalls in this branch of work, but one which we do not think has received sufficient notice is the thorough removal of hypo before bleaching in the ferricyanide-bromide solution. The photographer who has any chemical knowledge of course realises that if any appreciable quantity of hyposulphite remains in the film it forms Farmer's reducer as soon as it comes into contact with the bleaching solution, the image being partially dissolved instead of being merely bleached. The common practice of throwing the prints direct from the fixing bath, and allowing the tap to run upon them, is a most mischievous one and the cause of no end of troubles. In a case which recently came under our notice a batch of prints was entirely ruined in the way we have just described, although the so-called washing had occupied two hours. Where the water had reached the surface of the prints near the edges, and all over the outside ones, the toning was quite even and satisfactory.

but in other cases large patches were greatly reduced in strength, and even obliterated, by the bleacher, this, of course, being made apparent only when they were put into the sulphide solution. Failing an efficient mechanical washer, all prints should be washed in changes of water, each print being transferred singly from one dish to another. We have found that six changes given in this way (allowing five minutes to each) is quite safe for all practical purposes.

* * *

Dry-Mounting and Unsafe Mounts. If there still be any photographers who do not employ the dry-mounting process we would point out to them one of the great advantages of the method in this time of shortness of paper and cardboard. Many photographic papers, particularly of the P.O.P. and self-toning classes, are very susceptible to impurities in the pulp of the mount, hypo being the most common of these, while in other cases the colouring matter used is soluble and liable to stain the print. The shellac tissue used in dry-mounting effectually insulates the print from the mount, and even in a damp situation there is no danger of deterioration. The novice in dry-mounting must beware of any dampness on the print, as this will cause adhesion between the metal plate and the gelatine surface, which, of course, will be ruined. Much of the present make of bromide paper is very thick, and it is surprising how much moisture it will absorb from the atmosphere on a wet day. Bromoils, or prints finished in oil colour, may be dry-mounted if sufficient time be allowed to elapse before mounting. With bromoils or thinly painted bromides at least a fortnight should be allowed for drying, while heavily coloured prints should have at least a month's rest. Carbon prints sometimes show uneven patches if a polished plate be used, but this may be avoided by interposing a sheet of fine *wove* paper between the surface and the metal plate, which paper should be thoroughly dried in the press before bringing it into contact with the print.

* * *

Enlarger Design. Some weeks ago we reprinted some technical papers showing the movement there seems to be in the direction of using high-power metallic-filament lamps in projection and optical lanterns according to a system which dispenses with the bulky and heavy condensing lenses. Such a development, as we then said, needs to be watched, inasmuch as the present design of photographic enlarging lanterns is one susceptible to very great improvement. As an article of trade the average enlarger, by reason of its considerable bulk and weight, makes whatever sales it secures in spite of these handicaps. Any type of construction which at one stroke would cut out the great bulk of the lantern body and the weight of the condensing lenses would obviously result in a pattern of enlarger with which the present models would find it hard to compete. We see an instance of progress on the lines we have indicated in the shape of an enlarger advertised in an American contemporary for sizes from the smallest up to 10 × 8. Here the light-source is a metal filament lamp placed comparatively close to the negative, which, however, secures even illumination by means of a series of mirrors arranged around the inner wall of the light metal chamber which encloses the lamp. Judging from the drawing, the whole depth of the lamp chamber behind the negative, in the case of the 10 × 8 enlarger, is not more than ten or twelve inches, and the character of the illumination dispenses with any necessity for altering the position of the lamp for different scales of enlargement. It is scarcely too much to forecast that by the use of a light-source such as this enlargers may be provided with a means of illumination of such small size and weight that there will be no comparison between a lantern fitted with it and one of the bulky type which for so many years has been the standard.

* * *

The League of Nations. When the war is over and we can again turn our attention to foreign trade, we trust that some serious effort will be made by our manufacturers to make it easy for other nations to buy our goods. In the past our arch enemies profited by our unwillingness to adopt metric measures and to quote prices in any but British currency. It is, perhaps, too much to hope to see the adoption of a system which would range with the franc and the dollar, but there is no doubt that such a change could be made more easily now than it could have been before the war. All our prices are now in the melting pot; the penny is no longer the unit of the poorer classes; while the sixpence and shilling have lost their former purchasing power. The halfpenny difference between a shilling and twenty-five cents would often be enough to turn a small profit into an adequate one, but now if the slightest advance over a shilling is necessary there is usually a jump to fifteen pence or more. The question of plate sizes is a difficult one, as in many cases it would be necessary to use a much smaller size or to scrap existing cameras and slides. Still, the obstacle should not be insuperable. As it is, plate and paper makers have to keep double stocks, the English sizes being useless for, say, the South American market, while the metric sizes cannot be used at home.

ELBOW ROOM.

To every photographer comes now and then a slack time in which, in order to prevent a loss of morale through brooding over the prospect of speedy ruin, it is a good plan to look around and make arrangements for dealing with a possible revival of business. There are few establishments in which there is no room for improvement as regards facilities for working, and in a business of so progressive a nature as photography there is need for constant rearrangement and renewal of plant if things are to be kept up to date. Although every worker has his own methods of working and his own problems to deal with, there is one direction in which nearly everyone may usefully move, and that is in clearing out obsolete plant, and thus obtaining more elbow room in which to handle current work. As an actual example of what we mean, we may mention a case in which a large rolling press, of which the owner was very proud and which had done good service years ago, occupied a space of nearly twenty square feet in the centre of a workroom, while the dry-mounting press and trimming bench were squeezed up into a dark corner. The rolling press was not really needed once a year, yet it cramped all the mounting every day, and thus wasted its value every few months.

A very good rule is to have a place for everything, and as far as possible to keep everything in its place. Nothing hinders work so much as having to clear away the debris of one job before starting upon the next. In planning a modern factory care is always taken to arrange that, from the moment the raw material arrives at one door until the finished product leaves by another, there is a continuous even flow from one department to the next, not an unnecessary step being taken nor an awkward corner left. So, on a smaller scale, should photographic premises be arranged, and as new processes are adopted so must the working space be replanned.

Starting with the studio, a clean sweep should be made of all obsolete accessories, plant and furniture. Many photographers buy a new camera, but cannot bring themselves to scrap the old one, so into a corner it goes, making work for the cleaner and getting into the way when that corner is wanted for current work. If there be a spare room on the premises, let it be used as a hospital or store, but keep the studio clear of everything not actually in daily use. The dark-room is usually none too large for its work, yet it is usually cumbered with out-of-date washers, racks, and tanks which are never used, and are simply rusting away, preventing proper cleaning, and usually impeding work. There is plenty of room in most dark-rooms to instal an up-to-date printing box, if only the old junk were cleared out.

One of the weakest points in most studios is a total lack of system with respect to receiving and storing of goods. For lack of proper fixtures or bins, consignments of mounts, plates, and chemicals are dumped into the workroom and allowed to stand in everybody's way for days or even weeks. It is a good rule to allow nothing of this kind to stand upon the floor for a moment longer than is necessary to check the invoice. It must be moved sooner or later—why not at once? Where several rooms are available, it is an excellent plan to utilise all the windows for work benches and to fit the back part of the rooms to hold stock. Thus, as in one place we visited, the mount stock was kept in the retouching room, and plates and paper in the finishing room, while the negatives were stored within easy reach of the printers' filling-in bench.

Plenty of sink accommodation is a *sine quâ non* for quick and efficient working, and a good large sink in a well-lighted room is one of the most useful fitments which can be imagined. Here prints and enlargements can be cleaned up, reduced, toned, and re-developed without fear of contamination with the chemicals used for negative work. A sink cannot well be too large; it is easy to cover a portion for temporary use as a bench when required, but it is not easy to improvise temporary washing accommodation. Efficient arrangements and adequate working room greatly increase the producing power of the individual worker, and now that we are threatened with further withdrawals of man and even woman power it is essential that the strictest economy of labour should be exercised, and no trouble be spared in making such alterations as will enable two people to do the work formerly accomplished by three, a feat which is not so difficult in many establishments as it might appear. Moreover, after the war there will undoubtedly be a tendency to shorten working hours. Even now we find a great employer like Lord Leverhulme advocating a six-hours working day. This we believe to be a move in the right direction, and amply borne out by our own experience. We know of firms which find that a full day's work can be done in well-ventilated, well-fitted rooms between the hours of nine and five, while others working for two hours longer are always trying to catch up with the work, simply because time is lost and energy wasted in useless getting ready and clearing away.

PLATE-MARKER FOR 3-ON POSTCARD STRIPS.

The art of "dressing-up" photographs by border printing, mounting on multiple mounts, and other devices is very much in vogue with the high-class photographer, but is seldom practised by the cheap man or the medium-class photographer who has realised what an enormous demand exists for postcard portraits. We have perforce to study economy in everything, particularly in plates, and consequently any suggestions may be of service which will enable the photographer to save plates and obtain attractive results.

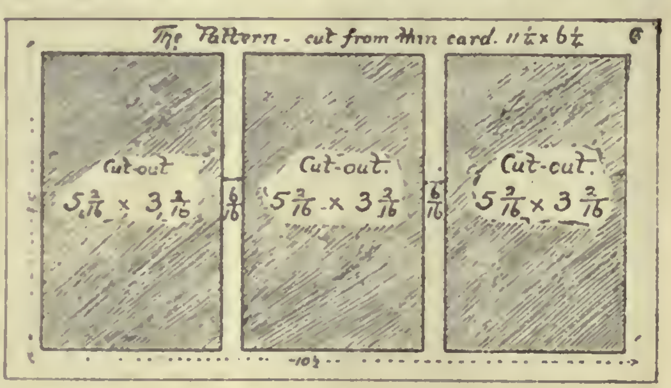
A neat plate-marked border on a postcard is quite easy to produce, greatly improves the appearance, and enables the photographer to charge higher prices and to use quarter-plate negatives. There are also several technical advantages which accrue, such as perfect flatness of the card and simplicity in trimming. White background vignettes are given a superior appearance when plate-marked.

Some workers will dismiss the idea of plate-marking their cards on the ground that it entails extra work, but with the device described it is claimed that this "extra" can be accurately done by young unskilled labour, with the probability of a substantial increase in the photographer's banking account.

The apparatus described can be made by anyone who can make a cut-out mount, and consists of a cardboard plate-marker, which gives three impressions at once on a card strip 10½ by 5½. This strip, after being plate-marked, requires only two cuts to produce three cards measuring 5½ by 3½, the plate-marks giving the guide for trimming. The whole thing being made of cardboard, at once suggests rapid wearing out of the templets, but if hard-pressed card is used, such as the 12 x 7½ G.B.E. card, 6-sheet, it is surprising what hard and constant wear the device will stand. After many thousands of strips have been put through the device, there is a slight wear of the cut-out portion, and this merely makes a wider bevel in the plate-mark.

Making the Pattern.

This should be cut from thin card about 11¼ x 6¼, taking particular care to get the measurements properly marked and the right angles correct. With a sharp knife cut out the three spaces, and, in order to check the correctness of the cutting, place the three pieces on top of one another. This pattern is most useful and greatly facilitates the making of further plate-markers of uniform size. The pattern is placed on a piece of six-sheet hard card, and with a fine pencil the cuts are marked out.



Making the Cut-Out.

In cutting out the centres a good method is to place the card on a sheet of glass and to use a steel straight-edge. The cuts should not be taken right up to the corners, as there is a great risk of over-cutting. The corners can be cut out when all the straight cuts are made, using a sharp-pointed knife. The next parts to cut out are the two slits into which the guide feeding strips sink when the device is closed. These narrow slits should be slightly larger than the feeding strips.

The Templets.

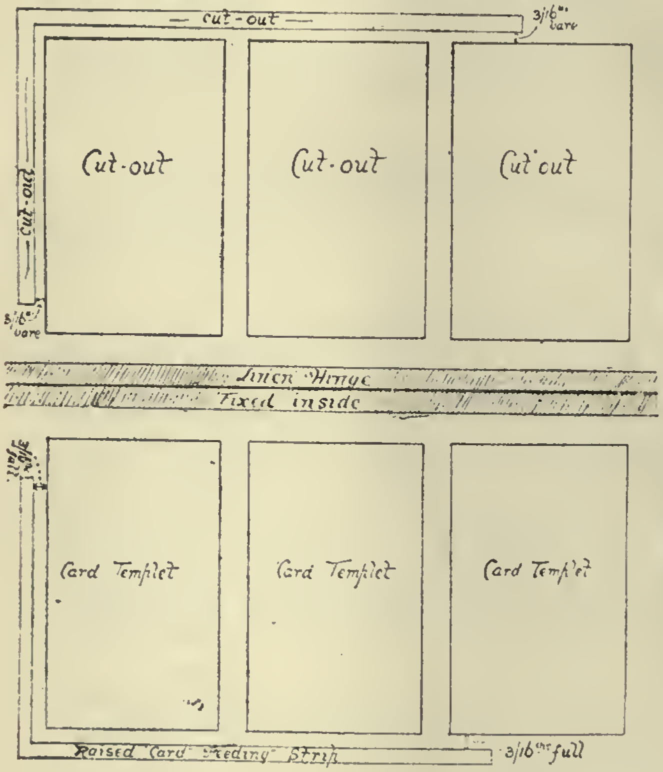
These are made from the actual pieces from the cut-out, and it will be seen that clean-cut corners are a necessity. These templets are required to be made very slightly smaller than the cut-out, and this is done by trimming off a merest trifle from the top and one side Another way is to buff the edges with glasspaper which has been glued to wood. The templets now have to be mounted to a stout cardboard base, the same size as the cut-out. In order to obtain correct registration, the cut-out must be temporarily fixed in contact with the stout cardboard base with gummed strips. The templets are now mounted in the cut-outs, taking care to place them so that the tiny margin all round is equal. The whole thing should then be put in a press for a few minutes to ensure perfect adhesion.

Hinging the Device.

The base and cut-out, still temporarily attached, must now have the edges trimmed together with a sharp knife or guillotine, taking care that the cut-out does not shift or sag. Now open the device and fix the hinge. It is most important to fix this inside, so as to secure perfect registration. Bookbinder's linen is very suitable, and the device should not be closed, except to check the correct fixing, until the hinges are dry and properly adhered.

The Feed Strips.

These should be cut from card of the same thickness as the cut-out and about 3-16ths of an inch wide. They are fixed to the base at a distance of nearly 4-16ths of an inch from the templets. The actual margin all round the postcard measures 3-16ths, but allowance has to be made for the portion trimmed from the templets. The device is then closed to ascertain whether sufficient clearance has been allowed for in the cut-out slits.



Finishing the Device.

As the cut-out portion has to stand the most friction, it is necessary to strengthen it by fixing a piece of solid thick cardboard, same size as the closed device, on top of the cut-out on the outside. This is best done by pasting the cut-out, putting the cardboard in contact. and placing in the press for a minute or two. If the base containing the templets is also made from stout cardboard we now have a strong substantial platemarker which will stand a great deal of wear. To use the device, place the previously flattened strip face down on the templets, "feeding" it to the guide strips, close, place in the press, and give light pressure for an instant. With a wheel dry-mounter the weight of the wheel spun down is sufficient. The strip is now ready for trimming. The very finest results are got by first pressing the strips in the hot dry-mounter, but good results are also got by first flattening them in the ordinary way, as the plate-marked edges prevent curling.

It is obvious that any error in the placing of the images when printing would spoil the results, but only gross carelessness in "feeding" could produce this, as all strip printing devices are correctly spaced. The chief cause of error would be the incorrect placing of the first image, and this can be prevented by fixing some sort of guide or mark on the printing machine. Correct placing of a vignette head in the centre of the card can be got by cutting a small oval in a postcard, placing the same over the negative, and adjusting it to suit the oval.

Although the device is designed for postcard strips "three-on," it is an easy matter to use it for "six-on," provided the strip measures 21 x 5½, instead of the usual 21½ x 5½. One end is placed in the device, the pressure given, and the operation is repeated with the second half. The margins all being equal, no harm can be done by thus placing one-half of the strip in the device with the portrait upside down.

In these days of mount shortage a useful line is a portrait printed on plain bromide card, plate-marked, and mounted by the top corners in an art paper folder. In this case it is best to place the strip in the plate-marker face up, so that the plate-mark is pushed out instead of in This facilitates mounting. When solid images with dark backgrounds are wanted, excellent results can be got by taking the sitters on one-half of a half-plate, masking the negatives to show a margin of about 5-16ths at the sides, and placing the image on the cards, so that the widest margin is at the bottom. These cards, when plate-marked, look very neat. The device is of no use to the worker who does all solid full-out cards, although some misguided photographers have used a plate-marker for this purpose. The device can also be used for making small art paper mounts, and will effectively plate-mark six-sheet card.

R. R. Rawkins.

Royal Institution.—The annual meeting of the members of the Royal Institution was held on May 1, Sir Jas. Crichton-Browne, M.D., F.R.S., Treasurer, in the chair. The annual report of the committee of visitors for the year 1917, testifying to the continued prosperity and efficient management of the Institution, was read and adopted. The report of the Davy-Faraday Research Laboratory Committee was read. Sixty-two lectures and nineteen evening discourses were delivered in 1917. The books and pamphlets presented amounted to about 299 volumes, making, with 513 volumes (including periodicals bound) purchased by the managers, a total of 812 volumes added to the library in the year.

Increased Charge for Photo-Engraving.—The Federation of Master Process Engravers had to meet a considerable increase in wages to the whole of the employees in the process trade which came into effect recently. This, in conjunction with the increase in costs of electric light and power, metals, wood, plates, chemicals, and paper, has resulted in the notification of a further increase of 12½ per cent. as from May 1 on all classes of process work, including artists' work, photography, etc., so that invoices now bear an advance of 25 per cent. instead of the existing one of 12½ per cent. This applies to process engraving only. Electrotyping and stereotyping prices remain as since March 26.

A CONVENIENT ACCURATE PHOTOMETER FOR THE MEASUREMENT OF PHOTOGRAPHIC DENSITIES.

[A notable contribution to the methods of photographic investigation was recently made in a paper and demonstration before the Royal Photographic Society by Messrs. W. B. Ferguson, F. F. Renwick, and D. E. Benson, describing a new form of photometer for the measurement of densities which owes its qualities to the joint labours of these three experimenters. The general features, details of construction and accuracy in use of the Ferguson–Renwick–Benson photometer, which may be shortly designated as the "F.R.B.," are set forth in the following notes respectively contributed to the Journal of the R.P.S. by its three joint originators. It will be seen that unlike many other density-measuring instruments the new pattern is one which consults the convenience and comfort of its user, is quickly operated, not easily put out of order, and is quickly prepared for use in making any set of measurements.—EDS., "B.J."]

GENERAL FEATURES OF THE F.R.B. PHOTOMETER.

WHAT are the main requirements in a photometer designed for the purpose of measuring negative densities? They are set out in the title of this communication. The first is accuracy, and the second convenience. With regard to accuracy, there are several different ways in which variations in light-intensity may be measured. I do not, however, propose to discuss their relative merits in this paper, but will content myself with pointing out that a photometer based upon the law of inverse squares is about the only form which can be constructed easily by anyone who is handy with tools. Such an instrument depends simply upon accurate measurements of distance between light-source and illuminated object; therefore, the only points upon which it is necessary to concentrate attention are the desirability of using a light-source which is as nearly as possible a point light-source (or, at any rate, the position of the mass-centre of the light must be accurately known) and accuracy in the measurements of its distance and, in addition, sensitiveness of the comparison surface. All photometric work is done by equalising the brightness of two contiguous illuminated fields, and it is desirable, therefore, that the form of comparison surface, which is employed shall be as sensitive as possible. The only other thing is the question of the actual reading of the scale, and it is not difficult by making the scale sufficiently long to ensure that the reading of the scale itself is at least as accurate as the actual adjustment. In adopting the law of inverse squares we have gone to the simplest type of instrument we could. The length of our instrument is such that the divisions are not inconveniently crowded, even at the most constricted part of the scale, and we decided in this instrument to adopt the familiar Lummer-Brodhun "optical cube," which furnishes a very sensitive form of comparator.

Assuming, therefore, that this instrument can be made very accurately, we may pass to the question of convenience, and here there are several points of considerable importance. Perhaps the best known form of photometer designed specially for negative measurements was the Schmidt and Haensch instrument. It was also, perhaps, the most unhandy form of instrument one could imagine. As sold it required a light of 1,000-1,600 c.p. and a large condenser in order to measure densities up to 2 with any accuracy. The heat of the powerful Nernst lamp or other illuminant had to be cut off by means of a water cell, and altogether it was a troublesome piece of apparatus. It had, however, some good points, and we have been able to incorporate them in this instrument. One point of importance in designing a photometer is that the source of light to be used should be one which is available to the majority of workers. The simplest solution is electricity, provided it can be made available for everybody. In this instrument we have endeavoured to make it so, for not only can it be run off the supply mains, but also from accumulators without any difficulty, and if accumulators are not available primary batteries can be used. It can be run very satisfactorily off 6-volt accumulator cells without any trouble, and as most people can get cells charged or can use primary batteries, we may take it that nobody need be prevented from using such a photometer as ours on that score. It is obvious, I think, that any photometer which employs more than one light-source is neither convenient nor reliable for the best work. Hurter and Driffield used two light-sources, which had to be carefully adjusted and kept constant, and that is a difficult thing to effect in practice. Here we are employing but one small lamp, of the ordinary motor-car headlight size, but made with a compact flat gridiron filament and of about 15 candle-power.

We come next to the range of the instrument. This question of range is in most photometers a somewhat serious one. I have mentioned that in the Schmidt and Haensch instrument, just alluded to, it was difficult to measure anything higher than 1.5 or 1.7 with accuracy even with a powerful light-source, because at those readings one was very near the limit of discriminating vision. Fortunately for possessors of this instrument, Dr. Goldberg has shown us* how to modify it so as to work with a small lamp of about the same power as we use. It is very important that the range of the instrument should be not less than 2 with good luminosity of field. We have arranged our instrument so that one length of the scale gives us 1.8, and by the use of a supplementary density that range can be increased straight away up to 2.8 or more. For by far the greater proportion of ordinary photographic measurements a range of 2.5 to 2.8 is sufficient to cover all requirements. For the purpose of X-ray density measurements, however, that range will have to be increased, and I shall mention later on how it can be done with our form of photometer. There is no difficulty about getting sufficient luminosity up to 2.3 or 2.4, and in any reasonably dark room one can work up to 2.6 or 2.8 with the instrument as it is.

The next point relating to convenience is that one does not want always to measure small narrow strips of plate. It is a great convenience to be able to take a negative and to measure the density of any part of that plate without cutting it up. A good many photometers have been devised in which it is essential that the piece of the plate to be measured should not be more than ½ in. wide. This leads to the exposure and development of very narrow strips of plate, which is very liable to introduce complications in the shape of irregular development. A good photometer from this standpoint should be able to take, at any rate, a quarter-plate entire. Our instrument does that quite comfortably, and, in fact, a half-plate can be measured at almost all parts without any necessity for cutting it. One of the good points about the Schmidt and Haensch instrument is that the plate under measurement lies on a horizontal flat table; that is also embodied in this instrument; but another bad point about it is that viewing has to be done vertically. Most of you who have looked vertically down a microscope for some length of time must have found that as the blood pressure behind the eyes increases your appreciation of delicate structure begins to fail. I find that under such conditions, in order to relieve the slight blood pressure behind the eyes when doing careful photometry, I have to throw my head back and look away from the instrument at intervals for a rest. We decided that we would, if necessary, sacrifice a good deal in order to sit comfortably in a chair and be able to look through a horizontal tube; that convenience has been attained, and fortunately without any sacrifice. In the Schmidt and Haensch photometer not only is the viewing tube vertical, but it is fixed, and the negative has to be slid under it, so that one is not quite sure, without taking special care, of the exact position, say within one-eighth of an inch, which is being measured. The rocking view tube of our photometer enables us to place the negative on the table clear of all obstructions both quickly and accurately.

[Mr. Renwick then proceeded to show on the lantern screen a number of diagrams and lantern views showing the appearance of the instrument in the closed form in which it was used (Fig. 1), how the sliding mirrors were covered in with a cloth tunnel which could be pushed back (Fig. 2), and also the index arrangement, from which the direct reading of the density was taken. This direct reading was a great convenience as against the calculations necessary with some patterns of photometer; there was no novelty about it, however, for the Hurter and Driffield type had a direct reading thirty years ago. He also pointed out the scale, the viewing tube, the pivots on which the whole of the viewing tube rocked, and the little chamber containing the lamp, which was adjustable. The final illustration (Fig. 3) showed a view of the apparatus taken obliquely, looking into the dark under portion of the instrument.]

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* *Zeit. angew. chem.*, 1916, 29, p. 394; Abst. *Jour. Soc. Chem. Ind.*, 1916, 1236.

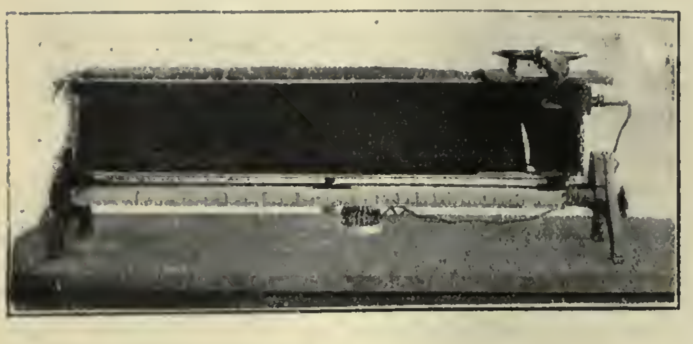

Fig. 1.

I have referred to all the points of the instrument which it is necessary to explain, and I have only just to remark upon one or two things which we think are still capable of improvement. They are not numerous, fortunately. For certain purposes it will be better to replace the opal on which the negative is laid by some more transparent type of opal glass. We have recently been doing some measurements which require reading with accuracy up to a density of 4, and I am satisfied that if we are able in this country to produce opal glass similar to the Zeiss opal glass in place of the ordinary common white opal, it will increase the amount of light available very greatly, so that the range of the instrument will be added to by another .5 or .6. Then there is one other modification which I think is a practical possibility, and one which I ought to mention, namely, the employment of a lamp of much larger diameter and higher candle-power. This, of course, will necessitate dropping the lamp further below the table, but if we turn the two travelling mirrors through 90 deg., it will not be difficult by a little modification of the viewing apparatus to arrange for the beam to travel along the bed of the instrument and then turn up and travel back again along the upper plane to the comparison opal. I do not know any lamp which is likely to be better than the Ediswan "Pointolite," which is a point source of light of small size, and with a light of anything like that candle-power it will be an easy matter to read densities up to 4. It is perfectly clear that if photometry in X-ray work is to be carried on in the same way as ordinary photometry is carried on now, measurements of density of that order will be an everyday necessity.

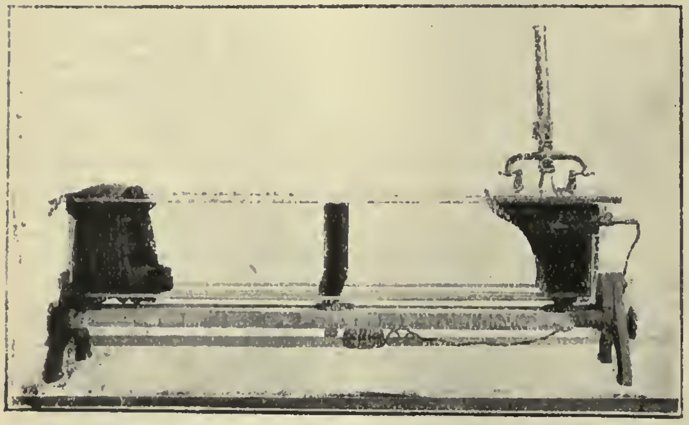

Fig. 2.

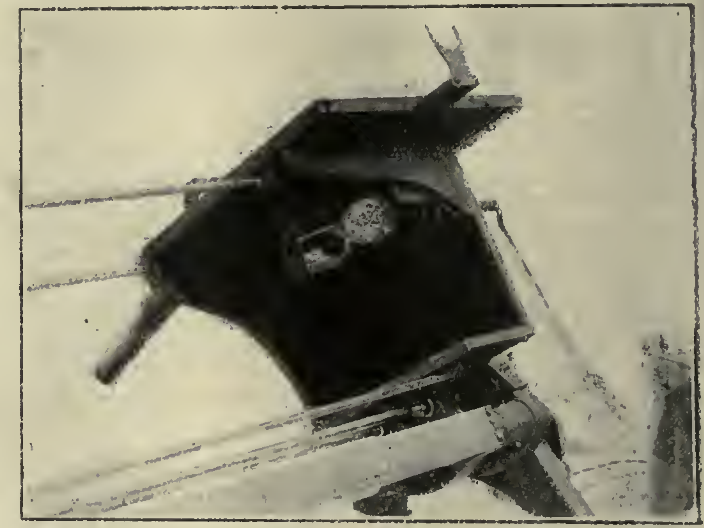

Fig. 3.

Lastly, it has recently occurred to us to see if we could supply this instrument with an attachment which would enable us to measure the reflection densities of bromide gaslight and other photographic papers without interfering with its use for measuring densities by transmitted light. We have made a preliminary attempt to solve that part of the problem as well. So far we cannot say very much about it, beyond the fact that we have our first model of this design, and the results already obtained with it enable us to say that we think we have been successful. I should like to say that the detailed design and the making of the instrument are entirely Mr. Benson's work, and if it had not been for his skill and energy the instrument would never have been devised at all.

F. F. Renwick.

ON ACCURACY IN READING DENSITIES.

I believe that it was an old former photometer of mine which gave certain ideas to Mr. Renwick and caused him to work at this subject, and to devise the photometer you see before you, but if it is derived from my instrument I can only say that it has been very considerably improved on the way—*C'est diablement changé en route*, as the French say. I have invented and made several photometers and used nearly every known one, but I am bound to say that this latest one is, in my opinion, the best photometer for this particular purpose which has ever been made. It is the most convenient to use, and the easiest with which to obtain accurate results.

There are one or two practical points to be considered in using any photometer: if you are going to obtain accurate results, it is necessary to go about the work from the beginning in a particular way. For instance, before you begin any experiments in the actual measurement of densities you must first be careful to fix the position of your zero. You may then find a certain index error, and it is advisable to make four or five, or even more, measurements when starting in order to find out exactly what that index error is. The scale is marked beyond the zero to the right-hand side, so that there may be an actual negative reading, and it may happen that the true zero of the instrument is not at the 0 point, as in the instrument for measuring reflection densities, where the zero point of the lamp in use is 0.03 negative, and therefore that has to be taken into account.

Another point to remember is that during the series of measurements one should, if possible, have no alteration in the current supply of the lamp, as any considerable change may affect the accuracy of a series of measurements. It is best to be sure of a regular supply, and if one happens to be working at the time when the main current supply is being changed it may in some cases lead to some small error owing to the fluctuation. If one is working from accumulators, of course, one is quite safe. In my own instrument I have to work from alternating current, and I have found after many experiences that the best thing to do is to put in a choking coil, for then by altering the position of the iron core one can regulate the current to such an extent as to get the precise amount of light which is most easy to work with. I have tried resistances instead of the choking coil, but with the alternating current the choking coil is the better method of current regulation.

In working with this instrument the reading taken by moving the mirror from one's right to one's left is generally different from that obtained by moving the mirror from left to right. I have found it best, therefore, to take a series of readings, first working from the left to the right, and then from the right to the left, and if four, five, or six readings are taken, and their mean calculated, one has got what is probably an extremely exact reading. When you have worked it out, set your index to the figure found, and after resting the eyes, judge the comparison surface, and if you find it perfectly even, you may be absolutely certain that you have got an exact reading. I will illustrate this by an actual case of an uneven series of readings which will show the advantage of the method. The successive readings were as follows (⟶ signifying working from left to right, and ⟵ from right to left):—

$$\left.\begin{array}{r}\longrightarrow 1{\cdot}023\\ \longleftarrow 1{\cdot}023\\ \longrightarrow 1{\cdot}028\\ \longleftarrow 1{\cdot}018\\ \longrightarrow 1{\cdot}036\\ \longleftarrow 1{\cdot}016\\ \hline 6{\cdot}144\end{array}\right\} \frac{6{\cdot}144}{6} = 1{\cdot}024$$

Between some of these readings there may appear to be considerable variation, but if the mean of them be taken it will be found to be about 1.24, and when I had got that particular reading I set the index at it, rested my eyes for a little time—it is best not to shut them, but to look at something very faintly illuminated—and then made an examination and found the comparison screen uniform. Of course, when one has got this figure it still remains to subtract the zero error.

There is still another question: how far can one rely upon the readings of this instrument? I have made a considerable series of measurements with the instrument demonstrated this evening and from them have calculated by Ostwald's method that the mean error of the instrument was ± 0.002. It means that one is accurate to about four parts in 1,000 with any density, which is about 1. Further experiments have convinced me that we can work within these limits when we are used to the instrument. It is probably known to you that, except by the merest accident, no two watches at any given moment register identical readings—probably the watch of each person in this room would give a different reading—and this is equally true of density measurements by different photometers. Nevertheless, it is perfectly easy to make the readings of density-measuring instruments agree, and in a paper which Mr. Renwick read to the Society two years ago he related his discovery that when one took a particular plate with particular densities on it, measured it in photometer A and in photometer B, and then took logarithms of the first measurement and plotted them against logarithms of the second measurement, one got a straight line, and from this straight line one can arrive at an equation which, applied to one series of measurements or to another, would give measurements which would agree. If we have more photometers than one, even though the readings of all the photometers are different, yet when this method of Mr. Renwick's is applied to them, one can get equivalent readings on any of them.

W. B. Ferguson.

[The paper and drawings by Mr. Benson describing the construction of the photometer are held over until next week.—Eds. "B.J."]

Miniatures by Mrs. Speaight.—Two examples of the miniature painting of Mrs. Alice L. Speaight are exhibited at the Royal Academy. One is of Mrs. Oscar Coles, and the other a particularly fine portrait of H.M. the King of the Belgians, shown by his Majesty's permission.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Comparing Definition in Lenses.

There is a tendency, when comparing results given by various lenses, to mistake brilliance of negative or print for good definition. A negative of the soot-and-whitewash variety may appear quite sharp when compared casually with one of poor contrast. The real test for definition is to enlarge the image, either actually on to bromide paper, or visually with a good magnifying glass. The test subject, of course, should be something containing plenty of small detail, showing sharp, clean outlines. If a specially fine test be required a sheet of tracing-paper can be ruled in squares with drawing-ink or Photopake, and a set of arrow-heads drawn in each square, as in Fig. 1. This is a very keen test if the paper be fixed against a window and photographed by transmitted light to a small size, and then the negative be enlarged again through the same lens, say to three or four diameters. The points of the arrow-heads should be sharp in the original and fairly near together.

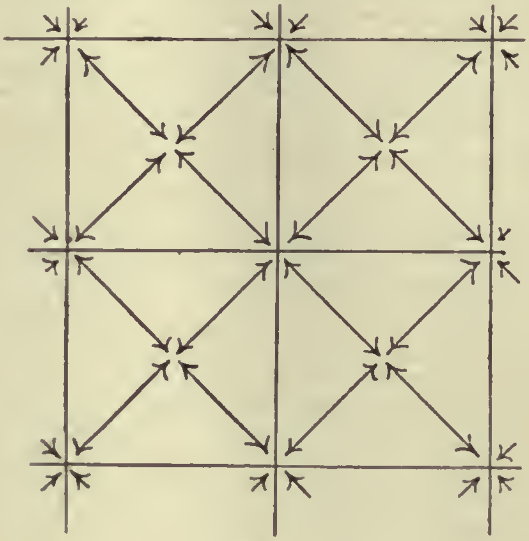

Fig. 1.

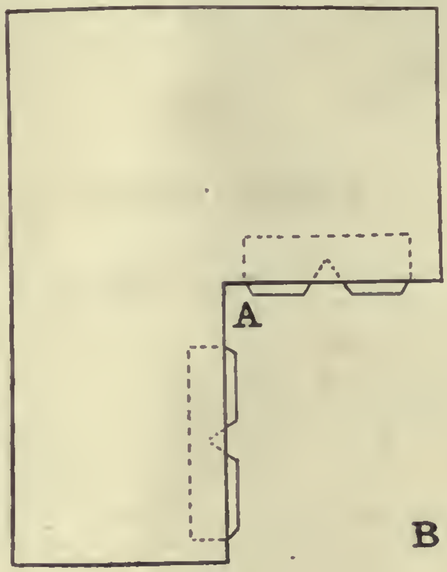

Fig. 2.

Fig 2 shows a carrier, easily made of cardboard, to take a small plate when testing lenses, as obviously only one corner of the field is required. When comparing results, any differences are seen far more strongly if the plates are laid together with the outside corners B together in the centre. The inside corners A being generally in the best defined area of the image will not show defects so much.—D. Charles.

Ortho and Panchromatic Plates for the Professional.

Very many of the failures that we hear of from photographers who use, or perhaps it would be more correct if I said misuse, ortho or panchromatic plates, may be traced to utter carelessness in handling. Photographers do not realise that when loading slides, or developing these ultra-colour-sensitive plates, no matter what the makers of the "safe light" used in the dark room lamp may say, there is no light to which these plates may be exposed with impunity without ill-effect, fog, or, at least, veil resulting with certainty from such a course. I have used many of these plates, and always when other circumstances permit use an ortho or panchromatic plate, but am always most careful when developing, etc., to let no direct light from the lamp shine on the plates; and it is only fair to say that fogged negatives never occur.

Those who use tank development ought not to find the least difficulty in this matter. I am sure that photographers as a whole do not realise the immense advantages of ortho or panchromatic plates. It is, of course, well known that an ortho plate does away with much retouching, especially with freckled complexions, but we are told that the screen prolongs the exposure into altogether impossible lengths. There are still two courses open. A plate of the anti-screen type may be used without a lens filter, and will be found to give as much correction as an ortho plate would with a three-times screen; at the same time, it will give a fine negative as regards tonal gradations and modelling, equal in every particular to portrait plates, and almost as speedy, while if a fuller correction is required I use a panchromatic plate, but without a screen. This will give as full correction as an ordinary ortho emulsion with a deep screen, and is in every way a satisfactory medium. It will be argued that these plates are expensive, and, further, that they do not keep well. I can only say that the expense will not be a great factor if it saves the labour of a lot of retouching, and, as regards keeping qualities, I have had both ortho and panchromatic plates in stock for eighteen months without finding that they had deteriorated in any way, and the ordinary commercial or portrait photographer will not be likely to put any undue strain upon his medium in this respect, especially at the present time. The comparative illustrations in the Wratten advertisements in the "B.J." afford striking proof of the value of the colour-sensitive plate, and the wise photographer will do well to adopt them as widely as possible to justify his own technical skill.—Expert.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications for Patents, April 8 to April 27.

Film Cartridges.—Nos. 6,147-8. Photographic film cartridges, packs, rolls, reels, etc. A. McCurdy.

Development.—No. 6,723. High-temperature development of photographic materials. A. J. Agnew, F. F. Renwick, and Ilford, Ltd.

Half-Tone Screens.—No. 6,435. Production of screens for half-tone, etc., photographic printing surfaces. E. Wilson-Smith.

X-ray Work.—No. 7,028. Light-proof container for photographic films when used to make X-ray negatives of the teeth. A. W. Buck.

Apparatus.—No. 7,054. Photographic apparatus. C. Leven.

Cameras.—No. 7,081. Photographic cameras. H F. Maynes.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Exposure-Meters.—No. 111,409. (March 16, 1917.) The invention consists in an exposure-meter in which a mechanical adjustment is provided for shifting the sensitive paper through the distance requisite to bring a fresh section into position for exposure to light. The meter may be made in combination with a stop-watch, the starting mechanism of the watch then bringing the fresh section of paper into place. Walram Derichsweiler, 38, Höschgasse, Zurich, Switzerland.

X-ray Film.—No. 111,913. (December 16, 1916.) The claim is for a film consisting of celluloid coated on both sides, with sensitive emulsion. Reference is made to Patent No. 10,098 of 1897. Austin Edwards, Coventry Road, Warwick.

Photographic Designs.—No. 102,048. (October 30, 1915.) In the production of ornamental designs, photographs are taken (in the camera) on sensitive paper mounted on a rotating cylinder (or rotating flat-plate) of a basic or elementary figure through an aperture in a disc which can be rotated round the optical axis of the lens, and also at right angles to the latter. Ulrich Benz, 168, Nordstrasse, Zurich, Switzerland.

Photographic Writing.—No. 103,309. (January 12, 1916.) Relates to a method of producing typewritten matter by successively projecting the images of single characters on to a moving sensitive surface. (English Patent No. 17,236 of 1915.) The present invention consists in a means for illuminating only a single character while making use of one light-source only. Siemens and Halske, Akt. Ges. Siemens Street, Berlin.

New Materials, &c.

Mounts of Distinction.—Mr. Reginald E. Carter, 39, St. James Street, Piccadilly, London, W.1, sends us a selection of folder portrait mounts from the many styles which he is in a position to supply. The specimens are, without exception, exceedingly choice designs of mounting. To instance one or another where all are examples of nicest discrimination would be invidious, but one very delicate style is the "Romily," a white folder with space for the print of a tone or two darker, and with a delicately vignetted border. The "Princess" is similar in style, but in a medium neutral tone. In the "Classic" and "Stretton" a more formal surround is provided for the print; in the case of the latter, it takes the form of the slenderest double line. Another very nice style of a light mount is the "Decklyn," a double folder for cabinet and carte-de-visite portraits, the loose mount in which has a deckle edge. Unfortunately, none of these descriptions come near doing justice to the designs; one must see them to realise the very nice effect of the textured and otherwise figured surface of these flexible but sufficiently stiff mounts. Prices may be had on application to Mr. Carter. In the case of the specimens which we have examined they range from 11s. to 26s. per 100, purchased in quantities of 1,000.

Kosmos Cream Dye.—A preparation which will be welcomed by photographers who have any difficulty—and such exist at the present time—in getting the Kosmos cream crayon papers, is that just issued by Messrs. Kosmos Photographics, Ltd., Letchworth, Herts, as Kosmos Cream Dye. It is a mixture of two dark powders, one red and the other brown, which is dissolved in water to form a stock solution. A little of this latter, when added to the ordinary fixing bath, produces on the 10b grade of Vitegas paper (which is a white paper) the delicate cream tint still so largely in favour, particularly when prints are to be sulphide-toned. The dye dissolves very quickly and easily in water, and forms a perfectly clear mixture with the hypo fixing bath. Apart from the addition of a little of the stock solution when making up the fixer, no additional operation is involved in producing the cream prints on the white paper. As we have found to our own satisfaction, the cream tint is not affected during the washing process, and moreover the prints can be toned by either the sulphide or hypo-alum method without detriment to the cream colour of the base. A packet of the dye sufficient to make 40 ozs. of stock solution is sold at the price of 2s. When it is said that only ½ oz. of this stock solution requires to be added to 40 ozs. of fixing bath, it will be seen that the tinting process adds the merest fraction to the cost of prints.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Tuesday, May 14.

Royal Photographic Society. "The Early Work of Hurter and Driffield." W. B. Ferguson, K.C., M.A.

Wednesday, May 15.

Croydon Camera Club. "Combination Landscape Printing." B. C. Wickison.

Thursday, May 16.

Hammersmith (Hampshire House) Photographic Society. "Some Photographic Tips." Rev. F. C. Lambert, M.A., F.R.P.S.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, May 7, Mr. W. B. Ferguson, K.C., in the chair.

A lantern lecture, "By Rail to the Land of the Midnight Sun," illustrated by a large number of slides, was delivered by Mr. W. Sanderson, J.P., who took his hearers first to Cologne and Hamburg, thence through Denmark, and from Copenhagen by the oversea ferry train. With the aid of an excellent series of lantern photographs, he then recounted his travels among the chief mountain and fjord scenery of Norway and Sweden.

A most hearty vote of thanks to the lecturer was passed by acclamation.

CROYDON CAMERA CLUB.

Mr. G. C. Weston, M.I.E.E., gave a capital demonstration on "After-work on the Print," being a sequel to a previous evening on "After-work on the Negative." He said he proposed to deal only with mechanical methods, and politely intimated a disinclination to discuss the legitimacy of the manipulations to be shown. If any worker could secure what he wanted by purely mechanical methods so much the better, but personally he had never seen a straight print which a little judicious handwork would not improve.

The water-colours (preferably cake) he employs for matching varying shades of black and sepia are india-ink, blue-black, neutral tint, burnt-umber, and vandyke-brown. He said he did not need to dwell on spotting, but beginners must beware of attempting to cover large spots with one application of the brush: these demand careful stippling. For removing black spots, a nib-trimmer is useful, taking care to shave them away, and not dig down into the paper. He always prepared the surface of a bromide-print by going over it with a pad moistened with methylated spirits, now almost unobtainable, but even a rub over with a clean handkerchief was better than nothing. For strengthening shadows, etc., he recommended blacklead, but if conté crayons are preferred, Messrs. Winsor and Newton supply them in all shades. If the blacklead shows a sheen, steaming the bromide-print will remove the gloss. The print, kept constantly in motion, is held a few inches away from the spout of a kettle containing a small quantity of water on the boil. A glass brush is useful for introducing white patches, and is operated through a thin celluloid stencil, but the reduction often is not very even. For much work on an untoned print he employed a mixture of the finest pumice powder and blacklead as sold by artists' colourmen. It is essential that the two be thoroughly incorporated. Three mixtures are made to render different depths of tint, and are kept in muslin bags, and the powder is dusted on the print in pepper-castor fashion, and worked in somewhat lightly with paper stump, or a pledget of cotton-wool. Indiarubber will remove the lead from any parts not requiring it. This powder process, he said, is suitable for all bromide-papers, except glossy ones.

An alternative and very effective method for bromide-prints of any colour and surface consists in applying artists' oil colours. The surface of the print, which must be free from cracks, is first gone over with some medium applied with a wad of cotton-wool. The medium he used is not now obtainable, but equal parts of rectified turpentine and poppy-oil is fairly satisfactory. Some mediums yellow the print in a short time. Another wad of cotton-wool is now taken, touched with medium from the first wad, and a trace of colour applied, and off we go again in much the same way as before, but using more pressure. Clean wool will partially remove, and if charged with the medium, wholly remove, colour where not wanted. For untoned prints, Reeves' charcoal-black is excellent. The lecturer, in conclusion, said that it is not the amount of colour put on which tells, but the little applied in exactly the right place. A strong point in the methods demonstrated is "that they do not give one away." (There is a naiveté about this way of expressing the fact which is most refreshing.)

In the discussion, Mr. J. M. Sellors playfully upbraided the demonstrator for revealing the methods which he (the speaker) had employed for years, and in doing so heavily discounted the interest members may take in his future pictures, as nothing damps appreciation more than speculation as to whether a pictorial study is mainly due to photography or hand-work. When steaming bromide-prints, he added, great care is necessary; some are very resistant, but others are apt to go mealy on slight provocation. He had used glass brushes with satisfaction, but they required occasional cleaning on glass-paper. He warmly congratulated Mr. Weston on having so ably disposed of the old contention that hand-work on the print is immoral. The president, Mr. A. F. Catharine, said that after seeing the vast possibilities of alteration and improvement, he felt he might at last undertake a portrait of the "office boy" without giving offence to any. He had found that greasiness might be removed (from the print) by ox-gall; no butcher's coupon is required as artists' colourmen supply it. Mr. E. B. Wright—a youthful visitor in the enthusiastic and enviable stage when one regards editors of photographic journals as being but a step removed from the divine—settled a minor point raised by saying he had read in a book that so-and-so was so. It is sad to think that with increasing age and experience early beliefs will undergo revision, or, perchance, reversal. A most hearty vote of thanks was accorded the lecturer, for a demonstration of real interest carried through in first-class style.

It may not be out of place to supplement this report by an indication of the transformations effected by Mr. Weston, who is obviously a photographic technician, and a skilled draughtsman to boot. Into a straight bromide-print of good quality, but far from exhibition standard, he introduced distant hills, and a sky broken with excellently done fleecy cumulous clouds. Three-quarters or more of the landscape also received generous attention, some parts being altogether obliterated, and others suppressed or accentuated, high-lights being picked out as required. The final result is in the nature of a scumbled drawing or painting (either in lead or oil-colour), executed on top of a photograph, with little or no indication where one process begins and the other ends, yet reminiscent of that puzzling tonality so frequently seen in photographic exhibitions. In many it might well secure the premier award for the best "photograph" on the walls. Despite Mr. Sellors' congratulations on the extinction of the charge of immorality—apparently based on the cheerful idea that what cannot be detected is ethically non-existent—Mr. Weston expressed no opinion on the point; he was out to show what could be done, and remarkably well he did it. No suggestion is made or warranted that he carries things to the extent demonstrated in ordinary practice.

Those in the club who regard purity of medium to be closely allied with sincerity of thought and expression in any art, and who strive to produce artistic photographs by what they consider to be legitimate methods, for years have felt some natural bitterness owing to being perpetually up against such hybrids as evolved by Mr. Weston, neither fish, flesh, nor fowl. Let them take comfort from the fact that nothing can be more conducive to a reaction on the lines they desire than his brilliant display as a monochrome painter. Faking has been discussed over and over again without agreement, and its extent and scope must ever be left to a sense of proportion in the photographer or medium mixer. If pictures are entered for competition ostensibly as the product of the camera, then the spirit of the sportsman is put to the test, that spirit which scorns shams, and demands that everything shall be above board, and all shall start fair.

Commercial & Legal Intelligence.

Particulars on Business Stationery.—At the Mansion House Police Court on Tuesday last, before Alderman Sir Edward Cooper, Messrs. Fuerst Brothers, Ltd., chemical manufacturers, Philpot Lane, were summoned by the Board of Trade for contravening the Particulars as to Directors Act, 1917, by addressing to the Nitrogen Products and Carbido Company, Ltd., two letters in which the names of the directors of the firm and their place of origin were not inscribed in legible characters. They pleaded "Not Guilty."

Mr. Ellis Cunliffe, prosecuting, said that two of the directors were brothers—Mr. J. F. Fuerst, who had, by legal steps, changed his name to Forster, and Mr. Jules Fuerst. They were of German origin. The company asked the President of the Board of Trade to exempt them from the provisions of the Particulars as to Directors Act, and their request was supported by a highly placed personage, but the application was refused. The company then printed on their notepaper their name and address, with the words, "For registered particulars see back." On the back, in microscopic characters, was the information that the Fuerst brothers were born in Swabia.

Mr. Percival Clarke, who defended, said that the "highly placed personage" mentioned was Lord Moulton, the Director-General of Explosive Supplies, whose department was employing the company to supply chemicals to the Ministry of Munitions, the Admiralty, and other war departments. The brothers Fuerst had been naturalised in this country for over forty years. The prosecution had been inspired by business rivals.

Sir Edward Cooper ordered each of the four directors to pay a fine of £10 and £1 1s. costs.

Legal Notices.—Notice of intended dividend is given in the failure of Montagu Alexander Pyke, photographer, Old Bond Street House, 6, 7, and 8, Old Bond Street, London, W. Proofs must be lodged on or before May 18, with Mr. E. S. Grey, Official Receiver, Bankruptcy Buildings, Carey Street, W.C. A receiving order has been made against Walter Hubbard Cook, postcard dealer, 323, Cleethorpe Road, late 83a, Hilda Street, Great Grimsby. The order was made upon the petition of the debtor.

News and Notes.

The Death is announced, after a long and painful illness, of Mr. F. G. Phillips, for many years in the optical business in Charterhouse Street, and for some years before the war agent for the lenses and other optical goods of the firm of Voigtländer.

Lectures in Photographic Chemistry.—A series of nine lecture-demonstrations on the chemistry of photography begins at the Choumert Road Commercial Institute, Rye Lane, Peckham, S.E., on Thursday, May 23. The subject is dealt with by showing such processes a ferro-prussiate and silver printing, carbon, oil, Ozobrome and bromoil, platinotype and sulphide toning and intensification. These demonstrations will afford an opportunity for consideration of the chemical principles involved in photographic processes. The instructor is Mr. Horace Wright, and the fee for the course one shilling.

Sending Photographs by Post.—At Brentford Police Court Gaston Deru, of Park Road, Twickenham, was summoned for infringing the Defence of the Realm Regulations by transmitting a letter abroad otherwise than through the medium of the post. Mr. Williamson, who prosecuted, stated that on February 7 a letter from the defendant, addressed to a person in France, was found in the postbag at Calais. The letter contained two photographs of the defendant, which he asked his friend to send to his parents at Geneva. The defendant pleaded "Guilty." He said that his action was due to a request of his parents, who were anxious to see what he looked like after four years. The Chairman of the Bench said they recognised the gravity of the offence, but as it was the first of the kind which had come before them they would deal with it lightly. He ordered the defendant to pay a fine of £5 and costs.

Official Photographer in Hospital.—Second Lieut. A. Console is now back in London at King's College Hospital, Denmark Hill. He is progressing very favourably and looking forward to the fitting of an artificial leg, so that he can be about again "carrying on" with his photographic work. At the time of the "accident" he was taking photographs, and did not hear a silent 9-inch shell coming over. This exploded a few yards away, injuring his driver, wrecking the car, camera, and plates, and severely wounding his leg, which was amputated shortly after just above the knee. He is loud in praise of the excellent medical arrangements for wounded from the front line to London.

Correspondence.

. *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

. *We do not undertake responsibility for the opinions expressed by our correspondents.*

FREE-SITTING PROFITEERING.

To the Editors.

Gentlemen,—A short time ago a young officer was given a complimentary sitting by a high-class London firm. He was sent to Egypt and has died on active service. Some friends of mine wrote the firm asking the price per copy cabinet size, and have been informed that the price per copy is 12s. 6d. Is this playing the game? To me it seems like trying to make profit out of the unfortunate officer's loss. Fancy, £7 10s. per dozen!—Yours truly, Cousin Jack.

THE MOUNTING OF LANTERN CONDENSERS.

To the Editors.

Gentlemen,—I was interested this week in your article on Lanterns and Condensers. I quite agree with you that the modifications you refer to require attention at the hands of our manufacturers. I have been connected with lantern and cine. work for many years, and know these drawbacks, but we must not forget that one manufacturer at least has adopted the methods you advocate for the last few years. I refer to Messrs. J. Wrench and Sons. Both the bayonet joints and the stiff wire ring have been fitted to their condensers, and at the present they adopt the stiff wire ring also in their better lanterns; the method they adopt for ventilating the condenser is quite good, so we have at least one firm up to date in this respect. I was also pleased to notice you refer to the lantern as an optical instrument, and not as some writers and journals, who still call it a magic-lantern. It is appalling in these days to hear it described as such by people who ought to know better. I have no interests in the firm I have mentioned.—Yours truly, F. Broad.

65, Arley Hill, Bristol, May 6, 1918.

DEVELOPER FORMULÆ.

To the Editors.

Gentlemen,—I have been bringing into use, in a set of photographic notes recently, the system of notation used by Dr. Mees, and explained in an article by him in the "B.J." for October 19, 1917, in which he advocated, as many of your readers will remember, the arrangement of the quantities of the various constituents per litre of developers in the order "developing agent—alkali—sulphite—bromide," interpolating if necessary other chemicals. I am vain enough to think that there is one respect in which his system might be very materially improved.

As it stands it is perfectly satisfactory for the mere comparison of the composition of different solutions and for the representation of "single-solution" formulæ. On the other hand, it is not easy to represent the compositions of the two solutions of a two-solution developer. But if the order of the constituents is altered, the sulphite being placed before the alkali, this difficulty disappears.

For example, suppose we wish to represent a developer of which the published formula is arranged thus :—

Solution A.—Hydroquinone, 10 gms. ; sulphite, 40 gms. ; water to 500 cc.

Solution B.—Sodium carbonate, 140 gms. ; pot. bromide, 5 gms. ; water to 500 cc.

Take equal parts.

Then the developer as applied to the plate, and also as kept in the stock bottles, can be expressed in the one row of figures : H 10; 40/140 : 5, the diagonal stroke showing where the division comes between the two solutions. Obviously this is not practicable where the sulphite and the carbonate are represented in the reverse order.

There is no reason, of course, why the system, which is in reality an extremely elastic one, should not be applied to the expression of the formulæ in the British weights, nor is it necessary that two solutions should be the limit beyond which the system is inapplicable —all that is required is that the total volume of the solutions should total one litre, and that they should be mixed in equal parts for use.

Another point in the original system which appears to me to be a defect is the stipulation that the sulphite and alkali should be *anhydrous*. It is very seldom that the dry sulphite and carbonate are met with in practical work; it would therefore be much more convenient to make the figures represent the ordinary crystals as used every day.

I am not suggesting that each user of the system should evolve his own edition; I am merely seizing an opportunity to criticise before it is standardised by universal use.—Yours truly,

L. Sowerby.

Trinity College, Oxford.

OPTICAL LITERATURE.

To the Editors.

Gentlemen,—I am somewhat surprised that your correspondence columns have contained no earlier reference to the editorial "Axial Aberrations," of March 15. Without wishing in any way to deprecate the paper of Messrs. Tillyer and Schultz, it is only fair to state that the paper does not carry our knowledge of the properties of lenses or the methods of measuring their errors beyond a stage which was reached in this country many years ago. The statement in your first paragraph may be interpreted by your readers to mean that the reverse is the case.

The paper is chiefly of interest on account of the actual illustrations given. Such results have been obtained in a precisely similar way in this country. The modification of the Hartmann test described in the paper is not new, neither can novelty be claimed for the determination of both spherical aberration and coma from a single set of measurements. Measurements of this character, on the contrary, appear to have been first developed in this country. The earlier part of the paper, to which you give much praise, seems to the writer to be in several respects unsatisfactory, and in a number of statements inaccurate.

I do not, however, desire to discuss these matters, but to point out that progress in this direction was made in this country several years ago. It is possible that old files of the "B.J." may contain some records of this English work.

Much valuable work is being done in optics in England at the present time. Unfortunately, little of this is ever published, and hence the impression that little is done. Publication of such work is to be encouraged from almost every point of view, not least because it encourages others to take up such work (thus increasing the rate of progress), and because it corrects the wrong impression that our work on this subject does not amount to very much. But, publication or no publication, it is surely not expecting too much to assume that the Editors of the "B.J." are sufficiently familiar with the inner optical world to avoid any statement which may tend to confirm this wrong impression.—Yours faithfully,

British Optician.

[The article in question pointed out rather emphatically that there was nothing new about the method of testing, and simply claimed that Messrs. Tillyer and Schultz's paper was a valuable addition to optical literature, which it undoubtedly is. We have no doubt that, as our correspondent says, much valuable work is being done in England, but he admits that little of it is ever published. Therefore optical literature gains nothing, and English opticians fail to get the credit which he claims they deserve. Whatever familiarity with the inner optical world we may claim to have does not enable us to form any judgment as to the value of unpublished work which we never see. In this matter of publication there are marked signs of progress in America, but, we regret to say, very few in this country.—Eds. "B.J."]

SUBSTITUTES FOR REPEATING BACK.

To the Editors.

Gentlemen,—On page 195 of the "B.J." dated April 26 last, a correspondent (H. J. A.) deals with the fairly-well-known dodge of making several separate and distinct exposures upon one plate by means of shields. I have in the past given some attention to this particular class of work, and I consider my plan of cutting the shields to be more serviceable than that advocated by your correspondent.

In the sketches herewith, square cards to fit the rebate made for the reversing back are shown; the solid black part represents that portion covered by the opaque (wooden) part of the back when the latter is in its place in the camera, while the shaded portion represents that part seen when the reversing back is replaced, and the rectangular focussing screen is thrown back, or rather that part taken up by the plate.

H. J. A. illustrates his method of making eight exposures, and with cards cut as he recommends his work with them is limited to the taking of eight pictures on the one plate—he instances a half-plate, but quarter or whole may be used in the same way if the cards are cut to fit.

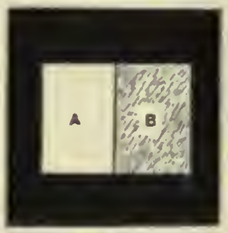

Fig. 1.

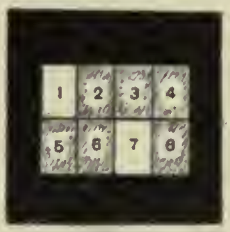

Fig. 2.

Figs. 1 and 2 represent the two shield cards I use for half plate work, and by cutting away one half (A, Fig. 1) one is given the opportunity of taking two quarter-plates by the use of one shield. When eight separate pictures are required, Fig. 2 is used in combination with Fig. 1. The eight places (see Fig. 2) are marked out very accurately, and Nos. 1 and 7 are cut away, then twisting, turning, and reversing the two cards in one way or another, one is able to expose through any one of the eight spaces. B. (Fig. 1) represents the shielding half which is at times so useful, and one which is not given in H. J. A.'s plan.

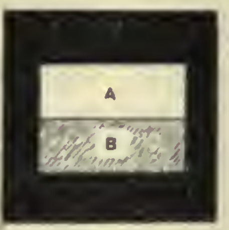

Fig. 3.

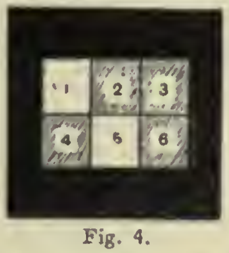

Fig. 4.

In making six exposures upon one plate, the "half vertical" exposures are not possible, because of the half of the plate falling in the centre of exposures 2 and 5 (see Fig. 4). Two panoramic (horizontal) halves, however, are possible by cutting one of the shields in half as shown in Fig. 3. Such a shield (or mask) enables one to get two capital panoramic exposures upon one plate, the part marked A representing the cut out opening and the shaded part (B) the uncut portion. This card, when used in conjunction with another, marked out in six equal parts (Fig. 4), and Nos. 1

and 5 cut away, enables the operator to expose any one of the six portions, in the manner described by your correspondent.

To make four exposures upon one plate, one needs but one card—one like Fig. 3 or Fig. 1, with only one-quarter cut away instead of one-half. Such a card needs no reversal, i.e., turning from back to front, all that needs to be done is to revolve it like a wheel, exposing each of the four quarters.—Yours faithfully.

L .T. W.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

W. Simpson.—We will see if we can get them for reproduction.

D. R.—If obtainable at present, you can get them from David Allan, 107, Mansfield Street, London, E.2.

Edgar Carr.—The publisher's address has not been mentioned, but you could get the book (price $3.50) through Tennant and Ward, 103, Park Avenue, New York.

Magnet.—Sorry we do not know the grading, but are quite sure the American Lead Pencil Co., 173/5, Lower Clapton Road, London, E.5, would tell you or send sample for trial.

S. W.—Ordinary ink; gelatine, rub with fine pumice powder; celluloid, most conveniently the Subtralene medium of the Vanguard Co., Maidenhead. Printing: we believe a thick litho ink is used.

F. Casson.—For economy in hypo, certainly rinse after fixing. Plain water as good as acid sulphite solution. Plain hypo is the more convenient if prints will stand it, but if not fix first in acid bath and follow with plain hypo.

J. W.—The best book, in fact the only one, dealing at length with present-day methods of colour-photography from both the theoretical and practical standpoint is "Photography in Colours," by Dr. Lindsay Johnson. Our own publishers supply this volume, price 4s. 11d. post free.

Pyro.—We are sorry we are quite unable to come to any clear conclusion as to the cause of the spots. They have not the appearance of air bells or the like in development. You should take up the matter with the makers, after which perhaps we could be of assistance to you.

W. N. M.—If by miniatures you mean the small coloured bromide prints, the usual plan is to dip the prints in spirit and to cement the thin celluloid to them by hot rolling. Messrs. Fallowfield supply a gas-heated roller for this purpose, and a varnish to be used, cold, for the same purpose is supplied by Messrs. Rheinlander and Son, New Malden, Surrey.

Photographs on Ivory.—May I trouble you in asking you if you could tell me how I can find the way to put miniature photographs on ivory. I really want to put bromide photographs on ivory for colouring and tinting.—H. J. Marmery.

If you want to transfer bromide prints to ivory, the most practical way of doing it is to use Kodak transferotype paper, in the instructions for which you will find all the necessary particulars as to how to proceed.

W. J. E.—There is no article that we can recollect dealing with the detection of forgeries by photography. There are several French and German books on the subject, but the only one which we know in English is "Qustioned Documents," by A. S. Osborne, an American book which is priced at 5 dollars 25, and for which the agents in this country are Messrs. Sweet and Maxwell, 3, Chancery Lane, E.C. You might be able to buy a copy from them though it is doubtful, but you could probably find the book, and others on the subject, in the library of thePatent Office, 25, Southampton Buildings, Chancery Lane, which is open free daily from 10 to 5.

F. T.—We do not quite understand what you mean by miniatures. If you mean the small photographs of three-quarter-inch diameter and upwards, they are made with an ordinary camera and lens just like copying any original upon a reduced scale, that is to say, if the negatives are not made of the required size to begin with in the camera. If you mean the very minute photographs which were formerly sold affixed to a small magnifier for insertion in pen-holders, etc., then the method is to copy the original on a greatly reduced scale on a wet-plate, but again with an ordinary camera and lens. For neither of these purposes is a microscope a suitable instrument.

Dallmeyer Lens.—I have a Dallmeyer 2 B portrait lens, W. 9 stops, good, but rather old type. Will you please tell me how I could arrange the lenses for diffusion of focus. There is no outside fittings, so would have to unscrew lenses. But which—J. Preston.

It is possible that your 2 B lens is of the "ordinary" type, in which case it cannot be adjusted to give soft definition. If it is of the "Patent" type, you will find some notches on the back cell with a little pin to serve as pointer. To soften the definition, unscrew the notched cell, the notches showing quarter turns. You may unscrew more than a complete turn if you wish.

FORTHCOMING EXHIBITIONS.

April 18 to May 17.—Hampshire House, Hammersmith, Photographic Society. Secs., H. T. Callender, 10, Acre Lane, Brixton, S.W.2; or W. T. W. Shiers, 201, Goldhawk Road, London, W.12.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

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If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C.2.

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SUMMARY.

The co-relation of lighting, exposure, and development is, perhaps, the part of successful studio work which most requires to be practised by those who are not sure of themselves in this branch of work. In a leading article we outline a system of self-instruction from which the beginner in lighting can greatly benefit. (P. 222.)

A tribute to the success with which women have taken over the technical, and, in some cases, the commercial, management of portrait studios is paid by a contributor whose business during nearly the whole period of the war has been run by the lady who previously was the receptionist. (P. 223.)

A serviceable stump for much finishing or retouching work can be made from the pith from a stick of elder wood. (P. 227.)

The rapid print-drying machine, consisting of an internally-heated drum round the outside of which prints are caused to pass, appears to be further gaining in favour among American photographers. It is stated that the commercial models have lately been considerably improved. (P. 222.)

A contributor tells how he extemporised a focussing-screen, namely, by rubbing a plain glass plate with soap. (P. 227.)

An item of practical moment in dealing with bad negatives is that a much better "print" can often be made through the lens of a camera than by contact. In the case of copies of faded originals, a working plan is to make the copy negative about half scale and to enlarge from this in making the "print." (P. 222.)

At the Royal Photographic Society on Tuesday evening last Mr. W. B. Ferguson, in delivering the first Hurter and Driffield Memorial Lecture, took for his subject the early work of Hurter and Driffield, and, in an admirable discourse, traced the experimental work and theoretical lines of thought which the two investigators followed for many years before the publication of their first paper. (P. 229.)

The optical and mechanical details of the design of the photometer originated by Messrs. Ferguson, Renwick, and Benson are described in the concluding portion of the R.P.S. communication, namely that by Mr. Benson. (P. 224.)

A system of using plane or curved mirrors in producing parallel or converging light in optical projection is the subject of a recent patent specification. (P. 228.)

An American inventor makes some special claims for a kite-camera outfit for aerial photography, one feature of which is that the camera is separate from the kite, and can be raised to any required point on the kite string when making an exposure. (P. 221.)

EX CATHEDRA.

Aerial Photography from Kites. The stride of the United States in the war continues to have its reflection in the pages of the photographic magazines. In the current issue of "Camera Craft" is some account of a kite camera and outfit for aerial photography, designed by a New York jeweller, Mr. S. Parks, who for some years past has been resident at Las Cruces, New Mexico, where this branch of photography has been a special study of his. No exact details are given, but it is claimed for Mr. Parks's camera, or rather for his kite, that it requires only one man for its operation, and that after the kite has been raised in the sky the camera can be caused to travel up to any required point on the cord and the exposure made. Evidently the separation of the camera from the kite is an advantage of the construction from the military standpoint. The camera offers a much smaller target to the enemy, and it can, moreover, be very quickly withdrawn as soon as the exposures are made. Obviously, the kite cannot replace the airplane as a means of photographing positions far beyond the enemy's lines from a point immediately over them, but undoubtedly for many purposes of reconnaissance close to the front it can release the airplane for work which requires a pilot, and thus is a means of both effective observation and of saving human life. There would seem to be good reason for the American Air Service or the British representative of the Royal Air Force in the United States investigating the claims of this invention.

* * *

Selling Apparatus. Now that there is a serious difficulty in obtaining many items of photographic apparatus, notably lenses and cameras, for professional use, such goods are likely to fetch a much better price now than when the war is ended and manufacturers are able to turn their attention to their original business. It is, therefore, quite in order to suggest the desirability of looking round with a view to turning into cash any pieces of really serviceable apparatus which are not likely to be wanted in the near future. Unused apparatus earns nothing and deteriorates in value, while its value invested in War Bonds earns a steady 5 per cent., with a bonus at the time of redemption. It is quite an easy matter to dispose of such goods without risk and at little expense, by means of an advertisement in our columns. Our deposit system protects both buyer and seller, and we do not recommend any transaction to be carried through with unknown parties who object to it. For the benefit of those who have not seen previous notes on the subject, we would say that when terms have been agreed upon, the purchaser deposits the purchase money with our publishers, who advise the seller of its receipt. The goods are then despatched to the prospective buyer, who should at once notify his receipt and approval, upon which the money deposited is forwarded to the seller, less a charge of 1s. (minimum) to 2s. 6d. (maximum) for the service rendered by our staff. If the goods are not approved, the money is returned to the sender as soon as the apparatus has been returned to the owner.

* * *

Rotary Print-Dryers. On two pages of the current issue of "Camera Craft" we see advertised four different models of the rotary print-dryer which, as we have noted for some time past, has steadily been growing in favour among professional photographers in America, though as yet little used in this country. The appliance is one which accomplishes within a small space, and for loose prints, the drying operation which the wholesale producer of prints by the roll or the manufacturer of emulsion papers carries out by means of an elaborate warming and ventilating plant. The smaller installation consists essentially of a hollow drum heated within by a gas-burner and serving to dry the prints which are carried around its outside diameter by means of an endless flexible apron. While a device of this kind seems simple enough at first sight, the design of a dryer which cannot be misused has not been such an easy matter. The number of patterns which have been evolved is sufficient proof of the difficulties which it has been necessary to overcome. We see it mentioned by our editorial friends in San Francisco that the last few months have witnessed really important improvements in these rotary dryers, and it would seem that our contemporary is echoing the views of those who make prints in quantity when it says that no one who has ever used a rotary print-dryer can be induced to return to the time-consuming and vexatious methods now being so rapidly abandoned by progressive photographers.

* * *

Through the Lens. It will generally be found that photographers who have had considerable experience in making enlargements have a preference for prints made through the lens either of a daylight enlarger or of the more usual lantern, when dealing with different negatives. From experiments we have lately made, we have certainly come to the same conclusion, for with negatives which were too thin to give a satisfactory contact print, a lantern exposure, with the aperture of the lens reduced to $f/32$, gave quite a passable result. For making copies from very flat and faded originals this method is specially useful. The copy negative should be made about half the scale of the original, thus securing a more plucky image than can be obtained by copying equal size at once. The prints may then be made to any desired size, and it will be found that the grain surface is rendered less evident. Much time may be saved by working to fixed measurements both in copying and enlarging, and as only one lens is usually employed for negative making and one for enlarging, two scales may be constructed upon strong tape, starting with a zero point in the centre. The greater conjugate focus for various sizes is marked on one side and the lesser on the other, the former being the distances between lens and original and the latter between lens and plate when reducing, while the reverse is the case when enlarging. If the same lens be used for both camera and lantern, one scale will suffice, otherwise a separate scale is required for each lens. The advantage of using such scales lies in the fact that no calculation is required nor is time lost in trial and error work. Thus the scale may be placed in the hands of an apprentice or other unskilled person. We strongly advise anyone fitting up an enlarging lantern to provide an adjustable easel, so that the distance between lens and plate may be fixed and the final focus obtained by moving the easel. When making reduced bromides from larger negatives much time may be saved in this way.

LIGHTING, EXPOSURE, DEVELOPMENT.

The novice in photographic portraiture is apt to form the idea that the lighting of the model is a great and terrible mystery which he has little hope of penetrating. He places his sitter, arranges his blinds, and secures what he considers a satisfactory effect, only to find disillusionment when he handles the negative or sees the print. This state of things, although too general, is not inevitable, nor should the production of a correct rendering of any lighting scheme be the effect of chance, for by a proper co-ordination of lighting, exposure, and development the desired result can be obtained with a fair degree of certainty. With the experienced worker this co-ordination proceeds subconsciously, there being no effort to deal with each problem as it arises, but the student must lay the foundation for such proficiency by observation, study, and experiment. To make a satisfactory rendering of any model the exposure must come between clearly defined limits, and the development must be similarly controlled. The first step is to select a suitable brand of plate and a standard developing formula, and not to wander from these until success is attained. Only by doing this can the full value of the personal element, which is everything in portraiture, be secured. There is little risk in doing this, as there is now not a single make of plate upon the market which will not give good results if properly handled. Experiment to be of any value must be systematic, and the results carefully memorised for future use. Plates are costly nowadays, but it is much cheaper and more satisfactory to expend a few dozen on experimental work than to continue to turn out indifferent negatives by methods which give no prospect of improvement.

As a start, the lighting of the model must be perfectly controlled; no variations of exposure or development will make bad lighting passable, although the best lighting may be ruined by them. It is a good plan for the young photographer to select what he considers a good photograph as a guide, to get a model as nearly resembling this picture as may be, and then to endeavour to produce a picture of the same character. This is a valuable exercise, as it conduces to the production of a definite result, and prevents the operator from being drawn out of his course by any accidental success, however brilliant. "Fluking" is the curse of photography; many a man, and woman, has been ruined artistically by a few lucky shots which he cannot repeat, but which have engendered in his mind the idea that he is an artist, and need no longer study the rudiments of his craft. The course we suggest is a simple one, but it cannot fail to give a clear understanding of the functions of exposure and development if conscientiously carried out. A sitter should be chosen whose presence can be obtained when desired, as nothing is so bewildering as having to change the model when striving for a definite effect. The lighting should be adjusted so as to reproduce as nearly as possible that of the selected picture; a series of three or four exposures should be made without altering the position of the sitter or the light, the only variation being in the time, which should range from decidedly under to full exposure. All the plates should be developed at once and for the same time, and the time of development noted. Development should not be carried too far, as this usually means blocking up the high-lights. Having selected from these negatives that one which gives the most satisfactory rendering, let three more plates be exposed under the same conditions, but giving them all the same exposure, namely, that given to the selected negative. Develop these together, but for varying periods, say for two minutes, four minutes, and eight minutes respectively. It should be noted that different makes of plate and even different grades of the same make vary greatly in their behaviour in the developer. As a rule, the more rapid the plate the longer will be the time of development required, and for this reason many people have formed the idea that rapid plates necessarily yield thin images. Not only the rapidity of the emulsion, but the nature of the gelatine used, has a considerable effect upon the time needed for development, so that it is impossible to learn from one plate how to treat another of a different make. Granted correct exposure, there is no better guide to uniformity than the Watkins factorial system, which is not so generally used by portraitists as it should be. With its aid there is no need for the operator to find that one day he has a run of thin images, while on another all his negatives are too dense. The factorial system takes into account temperature, the permeability of the film, and the nature of the developer, so that once the worker has selected a factor suitable to his work he can always secure negatives which are uniform in quality.

The skilful photographer who has spent many years in acquiring knowledge which he applies almost unconsciously to his daily work will perhaps think the foregoing hints unnecessary, but there are many people of great artistic ability who have never properly mastered the use of their apparatus and materials, and it is for these folk that we are writing. To our certain knowledge, several of the most noted modern workers are hopelessly erratic in their exposures, causing despair in the dark-room and consternation to the retoucher. Photography, it is claimed, allows an artist to realise his ideas without going through years of drudgery in learning to draw; so surely it is not too much to ask for a few hours to be devoted to learning to expose. Lighting is a matter of taste, and can be judged by the eye. Development may be to a great extent rendered mechanical. Exposure is the link between them which makes perfection possible, and only by systematic experiment upon one subject at a time can success be attained.

TO THE LADY OPERATOR.

[By casting what he has to say in the form of a letter to the receptionist who made good as operator and manager, the writer of the following notes has aimed at securing a wider reading of them. They represent actual experience—that of the head of a prosperous studio on the outskirts of London who got into khaki, and has seen fighting east of Suez, while his thoughts often turned to the business he had boldly left to the care of the receptionist. His views for the future of the lady operator are therefore the outcome of his own satisfaction in coming to a happy issue from the forebodings entertained four years ago.—EDS. "B.J."]

Dear "Receptionist,"—Many thanks for the yearly report. I was indeed pleasantly astonished to find that you had actually pulled the business back to *status quo*.

I notice in the first half year there was a slight drop, but the way you have picked up in the latter shows how you have been working and studying hard.

I know a few "bouquets" will not spoil you, therefore I speak candidly and tell you plainly I am quite pleased and proud of your achievement, and it must be very gratifying to you to know you are "doing your bit" successfully. I confess when I handed over the "reins" eighteen months ago I did not hope for *quite so* much from you. I know it must have been a worrying time at first, but the result is well worth the attempt. You must feel much more important. A pilot drinks fully the thrills of a fast flight. It is he who has the command. He has to keep the machine from side slipping.

As I look at your statement in front of me I cannot help thinking what a knock-out answer it is to those "all is lost" people who closed down so weakly when the "groups" were being "called up." I wonder what sort of reply they would make to it.

I know there were some special cases that had no alternative. But the aim of the majority seemed to be to get into the "rescue boat" (national liabilities) "at the double." They quite ignored the fact that there *could* be such a state of things as: No business, no "rescue boat."

But, thank goodness, there are a few Grace Darlings still about. Now, I have never heard of her taking the fees due to the lifeboatmen in those days. Have you? Then why this wail about women sticking to men's positions when peace is declared? What sort of a man is it who will allow such a thing to bother him? Besides, aren't there thousands of men in places that should be considered essentially women's? I don't think it is necessary to mention what they are.

Then, again, who is to judge? Who is to do the classifying? I don't intend to bother you with the complications of Women's Reform. But surely it is logically reasonable to conclude that providing she can prove to the world that she can do a certain kind of work just as well as the male, she has a perfect right to enter the market. I don't say it is right for those who promised to "hand back the reins" not to do so; but having carried out her agreement it seems to me *she* has more than an ordinary right to enter the field.

Some are predicting "terrific conflicts" over the matter, but I can detect a vein of "Boloism" here. I sincerely believe the two sexes will work together much better than they have before. Gigantic efforts must be made to supply the huge demands that will pour in from all parts of the world, and to cope with it women workers will be necessary in great numbers. Otherwise Germany will scoop them up. Besides, "fresh fields and pastures new" are bound to turn up; so let's smother this snivelling wail and bury the "mongoose and cobra" kind of spirit.

We certainly haven't far to look for a "fresh field." Commercial photography will open up widely for the male operator. There is much more in it than most studio-operators imagine. And while they have been looking on, rather contemptuously, the advanced amateur has slipped in and scored very successfully.

The camera is much quicker than the pencil for many things. Big firms—especially engineers—find it better to keep one photographer and reduce the drawing-department staff.

Before the war the old velvet-jacket school was ever ready to push down one's throat, "Photography is played out." Of course, one had to listen, out of common respect, to grey hairs and bald heads. And no doubt it is "played out" as regards the old order of things, sitting in the studio *waiting* for sitters. But to the man who infuses a little business atmosphere into his methods, backed up with a little resource and "push," success is certain.

Photography will be used more than ever in the commercial world of the future, and I can see nearly endless possibilities for the camera in commercial photography.

I only wish I dared tell you a quarter of its value to the Services. It is the "eyes" of those in command, which allows them to keep a long way back and yet know exactly what is in front. The Service photographers are continually getting their spheres of activity broadened. It saves many a C.O. sheets and sheets of red-tape explanations, and pots of strong language.

But to return to my subject—the woman at the head of things in the studio—it seems to me quite fit and proper that ladies should be attended by a lady-operator. Just notice what a difference there is with the male sitter. He hardly gets inside the studio before he starts "moaning." "Beastly performance," "Like having a tooth drawn." One seems to have to start right from the bottom with him. It would not seem so difficult if they would only exchange that worn-out simile "Like having a tooth drawn." I have tried to smile over this so many times that latterly nothing but a mirthless, rubber-like, shutting-up-of-the-face took place. Compare this with the same sitter entering the studio where the chic little lady-operator is in attendance. What happens? Well, it's mostly smiles—smiles of wonderment and admiration, smiles of ——. Well, it's all smiles. They quite forget about the dental comparison.

It is here that the lady operator often scores over the male, and seems to have no difficulty in pleasing the client as regards expression.

I have now trained three lady operators, and they are all doing well. One has acquired a business of her own, and specialises in photographing Purdah ladies in India, travelling sometimes great distances.

Here, too, the lady has a field *entirely* her own, and can fix very remunerative terms. Of course, this requires quite an appreciable amount of determination and strength of will; but this, I find, usually comes with responsibility. I have been on a Mohammedan Newale's estate for two and three weeks at a time, but was never allowed near the Purdah ladies' quarters, which is usually right the opposite end of the palace to the State guest-house. I feel sure that many would venture out that way if they only knew the *real* conditions. Women can now move about India quite alone with perfect safety. India always seems to be connected with poisoners, snakes, and wild animals, but a business-bent person can live a life-time there and never see, or at least never encounter, either.

I feel sure many London houses would utilise photography more for advertisement purposes if they could depend on getting female attendance right through.

On the other hand, many of us are not going to take kindly to the closed-up life of the studio.

We are now breathing the broader air of life. We "rub shoulders" with all kinds. We do not turn up our noses now at the man who turns up his sleeves. Surveying and map-making by the camera will hold out many opportunities for the man who likes the free, open-air life.

The surveyor of the future will do a lot of his work in an aeroplane with camera attached.

Some may not agree with me here, but after what I have seen, I feel it's only a matter of time.

I am writing this in the "watch below," but, as a matter of fact. I am in a quiet corner on the upper deck delighted to get on shipboard after over a year of "Robinson Crusoeism."

I had better conclude now, as it's nearly "eight bells," after which I have to "get busy."

As soon as time permits run me off a few lines, and let me know candidly what you think of my remarks. Wishing you every success.—Yours faithfully,

"The Manager."

A CONVENIENT ACCURATE PHOTOMETER FOR THE MEASUREMENT OF PHOTOGRAPHIC DENSITIES.

A notable contribution to the methods of photographic investigation was recently made in a paper and demonstration before the Royal Photographic Society by Messrs. W. B. Ferguson, F. F. Renwick, and D. E. Benson, describing a new form of photometer for the measurement of densities which owes its qualities to the joint labours of these three experimenters. The general features, details of construction and accuracy in use of the Ferguson–Renwick–Benson photometer, which may be shortly designated as the "F.R.B.," are set forth in the notes and drawings respectively contributed to the Journal of the R.P.S. by its three joint originators. It will be seen that unlike many other density-measuring instruments the new pattern is one which consults the convenience and comfort of its user, is quickly operated, not easily put out of order, and is quickly prepared for use in making any set of measurements.—Eds., "B.J."]

OPTICAL AND MECHANICAL DETAILS OF DESIGN.

Between the main supports or end plates of the instrument are carried two steel bars .75 inch diameter, the centres of which are 2.5 inches apart. On these bars slides the support for the mirrors by means of which the length of the path of the comparison light is varied. These mirrors, each 1.1 inch by .9 inch, are of the thinnest patent plate and are set at right angles to each other and at 45 degrees to the length of the instrument. The amount of travel of the sliding mirrors is 23.5 inches.

At the right-hand end of the instrument the sliding bars carry the fixed table and the lighting arrangements. The fixed table is 7 inches by 7.5 inches, and level with its surface are inserted two opals .5 inch diameter. Over the nearer one, which is an ordinary piece of pot opal 1 mm. thick, is placed the density to be measured, and the further one, which is 2.5 inches behind, is the comparison opal. This comparison opal, in order to secure more light, is a Zeiss opal 1 mm. thick. Above these opals, and in line with them, is carried the viewing apparatus. In this is an elliptical mirror, .75 inch on the minor axis, set at 45 degrees above the back or comparison opal, the light from which is thereby sent in a horizontal direction to the eyepiece.

Above the front opal and in the axis of the viewing apparatus is fixed a Lummer-Brodhun cube. An efficient substitute for the Lummer-Brodhun cube may be made by means of two right-angled prisms .5 inch square on the cathetus surfaces. An elliptical patch of silver is deposited on the hypotenuse surface of one prism and the two hypotenuse surfaces are cemented together, thus giving a .5 inch cube with an internal central reflecting surface at an angle of 45 degrees, similar in effect to that in the Lummer-Brodhun cube. This internal reflecting surface sends the light from the front opal into the eyepiece, the surrounding area being filled with light from the comparison opal.

It is quite easy to secure a very good match between the illumination of the central disc and the surrounding ring, the variation in intensity of the light from the comparison opal being made by sliding the mirrors before referred to along the bars towards or away from the comparison opal so as to increase or diminish the light.

The eyepiece consists of a lens of some 6 inches focus, the eye viewing the field through a 5 mm. clear aperture.

The source of light is a metallic filament lamp whose filament lies 1.5 inches below the table top beneath the front opal. The filament is a small flat gridiron and the light is therefore fairly concentrated and in one plane. This small lamp is covered by a removable shield which is perforated in two directions at right angles. Through one perforation the light passes upwards to the front opal directly over the lamp. Through the other perforation, which is at the back of the shield, the beam which illuminates the comparison opal starts on its way in a horizontal direction.

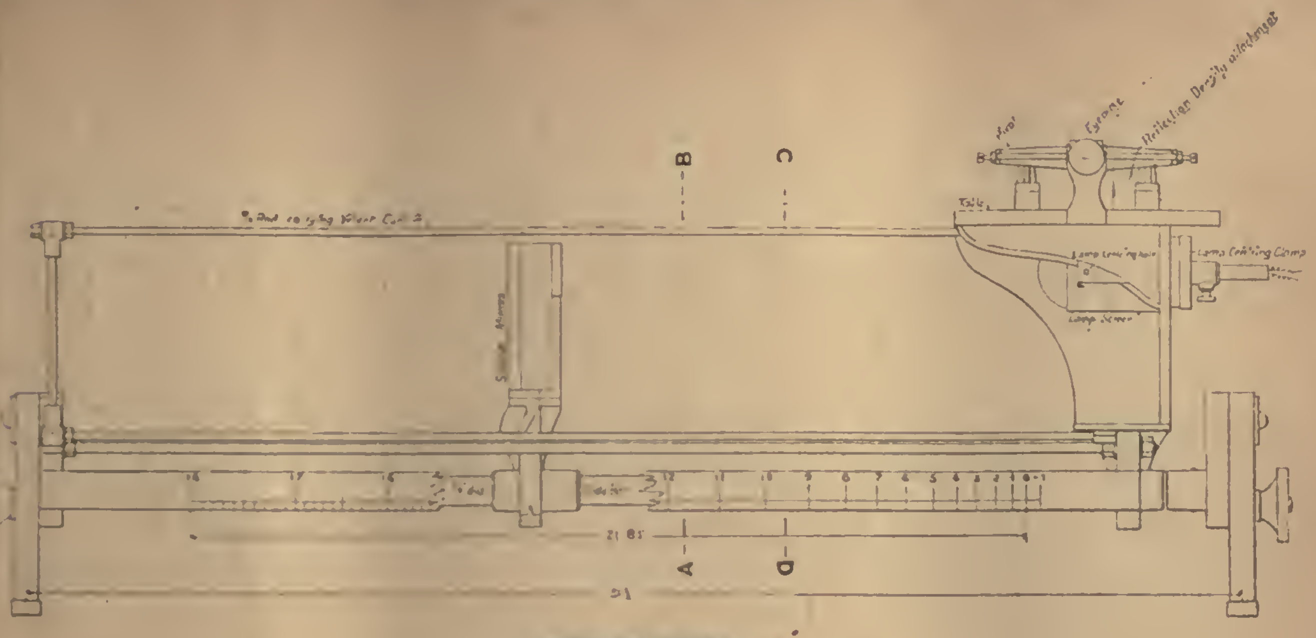
One and a half inches from the lamp filament a vertical mirror, 1.1 inch by .9 inch at 45 degrees to the path of the beam, is interposed, and this reflects the light to the left parallel with the sliding bars.

It falls on the front sliding mirror, crosses a 1-inch gap to the other sliding mirror, and is returned to another mirror set at 45 degrees to the horizontal, directly below the comparison opal, which is thus illuminated. This mirror is elliptical and .75 inch in diameter on the minor axis.

The correct calibration of the scale of such an instrument as ours is not at all difficult, but it is, perhaps, desirable to give a brief statement of the principles involved. The "law of inverse squares," as it is called, states that the intensity of the light falling upon any surface from a point source varies inversely as the square of the distance of the source from the surface, or

$$\frac{I_1}{I_2} = \frac{d_2^2}{d_1^2}.$$

From this it follows that if we can exactly match the intensity of the light transmitted by such a surface as the front opal of our



SIDE ELEVATION

instrument by illuminating the back opal from a distance d^1 and from a distance d^2 when the negative deposit under measurement is in position on the front opal, then clearly

$$\log \frac{I_1}{I_2} = 2 \log d_2 - 2 \log d_1 = \log O = D,$$

the density of the negative.

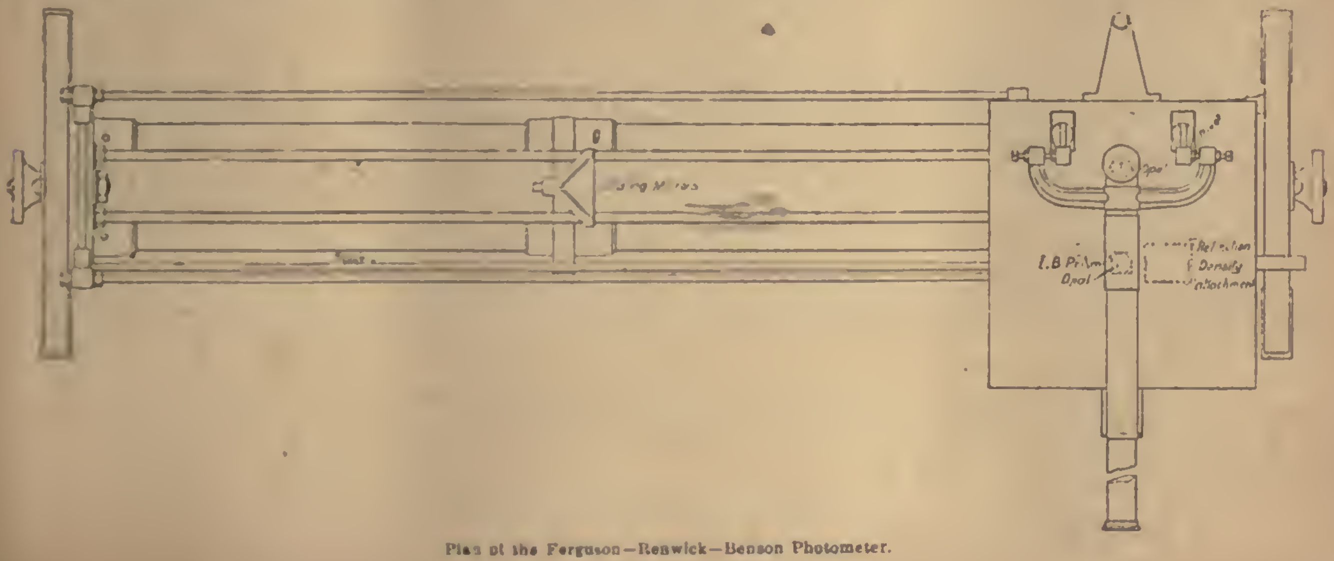
It will be seen, therefore, that density values can be read as differences on a scale properly divided and marked with logarithms x 2 of the lengths of the light-paths required to effect a balance. As it is undesirable, and in our instrument impossible, to shorten the variable light-path below a certain limit (in our instrument about 5½ inches), it is convenient to have the zero of the scale of densities at or near this shorter limit. This merely requires that instead of inscribing the scale at each point with values of 2 log *d*, where *d* is the total length of the light-path, it is inscribed with values of (2 log *d* — 2 log *l*), *l* being the length of the light-path when the pointer indicates zero on the scale. Suppose, for example, we decided to fix our scale zero at a light-path of 15 cm. Careful measurements would give us the position of the zero of the scale according to the design of the instrument. This point being fixed, other points are easily arrived at by adding to the density value to be inscribed twice the logarithm of the length of light-path at zero reading and deducting the length (of this light-path) from the antilogarithm of half the sum. The distances (*d* — 15) of several points of such a density scale from the zero mark are shown in the above table, *l* being assumed = 15 cm. If, as in our case, travelling mirrors are used, these distances must, of course, be halved.

Density reading 2 = 2 (log *d* — log 15)	log *d*.	*d* — 15.
0	1.1761	0 cm.
.1	1.2261	1.83 ,,
.2	1.2761	3.88 ,,
.3	1.3261	6.18 ,,
.4	1.3761	8.78 ,,
.5	1.4261	11.68 ,,

The scale of our instrument is fixed in front of the slide bars and is graduated from — .1 to 1.8. The length from 0 to 1.8 being 21.85 inches in our instruments.

The scale is read from a small indicator point attached to the sliding mirror carriage.

The minimum light-path from the lamp filament to the comparison opal in our instruments is 5.6 inches and the sliding mirrors then show a density of — .1.

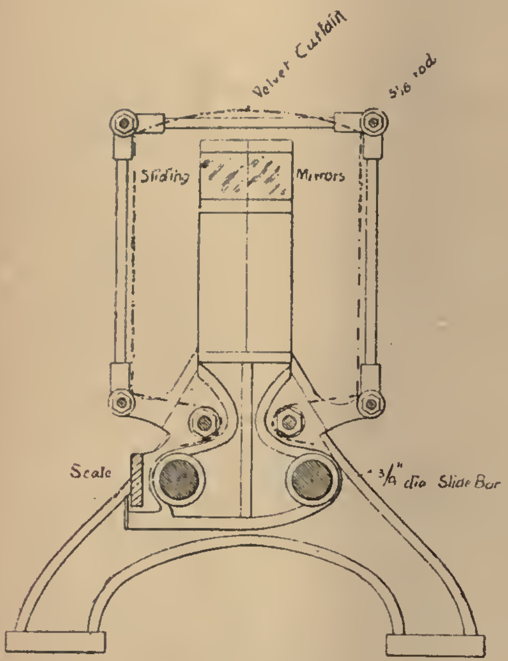


Plan of the Ferguson—Renwick—Benson Photometer.

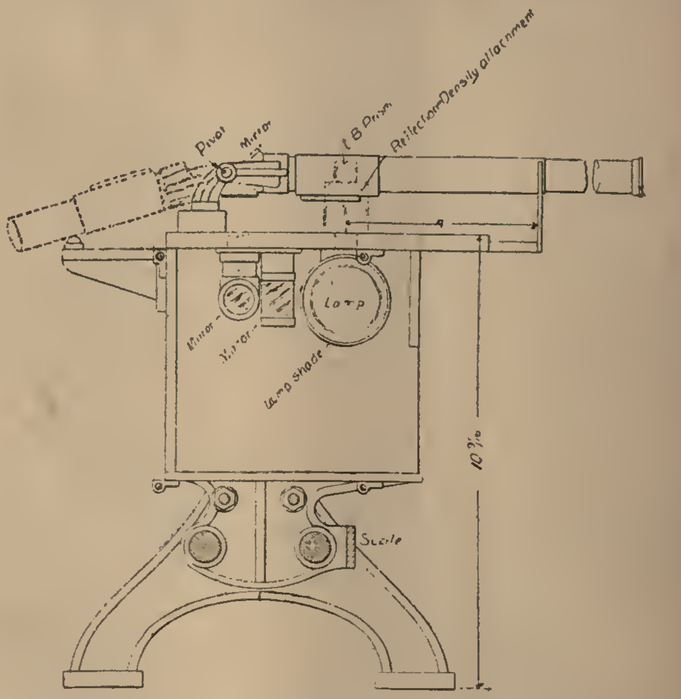
As the distance from the lamp to the near opal is only 1.5 inches and the distance from the lamp to the comparison opal after four reflections is 6.3 inches when the sliding mirrors are at zero, it is manifest that, even after allowing for the greater transparency of the Zeiss opal, that opal will be less brilliantly illuminated than the near opal with the sliding mirrors in the zero position.

Strips of bromide paper to be measured are kept flat by being dry mounted on a plane piece of metal such as a strip of ferrotype plate, and the opacity of the metal obscures the front opal.

Two holes for the purpose of centring the light are provided. One is situated in the front side of the frame supporting the table and exactly 1½ in. from its surface and central with the line joining



Section A B.

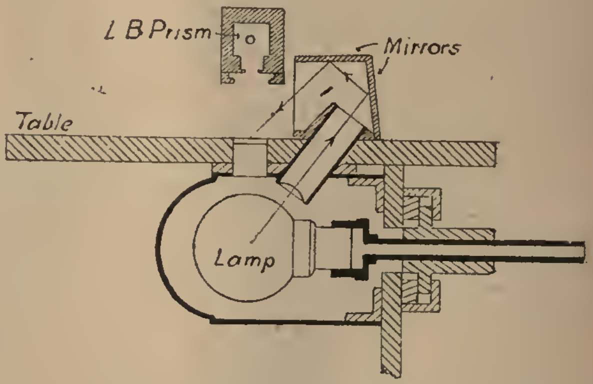


Section C D.

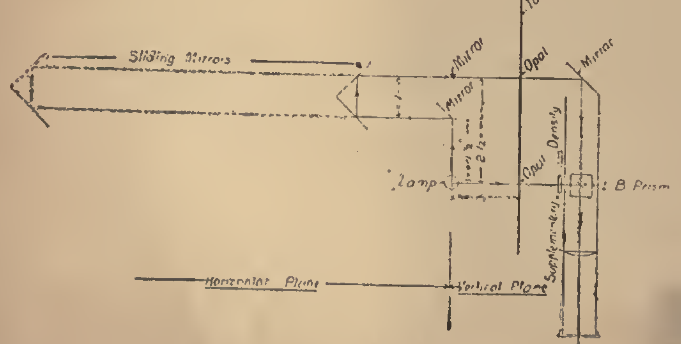
To secure a balance of illumination when the sliding mirrors are at zero a supplementary density is fitted below the viewing apparatus between the Lummer-Brodhun cube and the near opal. By selecting a suitable density a balance can be obtained at zero and with it in position densities can be measured to 1.8. By sliding the supplementary density out of the way, after ascertaining its value, densities higher than 1.8 are read, and by adding the value of the supplementary density to the reading on the photometer scale, true densities for these higher values are obtained.

The whole instrument is enclosed by a velvet curtain which prevents stray reflections, and reflections from the hand when moving the sliding mirrors, from reaching the opals.

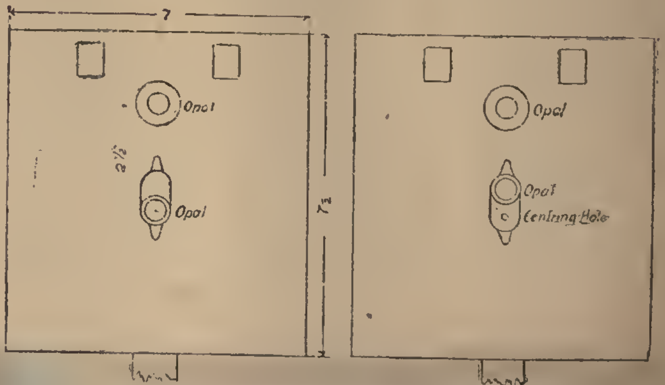
The attachment for reading reflection densities consists of a tube which obliquely penetrates the table and lamp shade and carries a lens short focus to render the light from the lamp parallel. The parallel light falls on a nearly vertical mirror, thence it passes to a horizontal one which throws it down at an angle of 45 degrees on the small area in the table occupied by the front opal. This reflection attachment is easily removable and measures 1⅜ ins. by 1 in. by 1¼ in. high.



Section through Reflection Density Attachment.



Development of Light-paths.



Opal in position.
Centring hole in position.

Plan of Table: eyepiece removed.

the centres of the opals. A second centring hole is provided in a small sliding metal plate carried in a shallow depression in the table top; the same plate also carries the front opal, and it is arranged so that at one end of its path the hole is vertically over the filament, while at the other the circular opal occupies that position.

Centring adjustments are provided to the supports carrying the lamp, and by setting the light to emit a beam normally through both the holes, the lamp can be centred very accurately.

The whole instrument can be tilted on an axis parallel to the slide bars so as to bring the eyepiece into a convenient position or to correct inaccuracies in the surface of the table on which the instrument stands.

D. E. BENSON.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

A Substitute for Ground Glass.

It may not often happen that one has the misfortune to break the focussing-screen of his camera, but when such a thing does occur it is sure to be on some very important occasion.

Such was my own experience a few days ago, and the way I promptly got over the difficulty may prove helpful to other operators, should they ever be placed in a similar dilemma.

With my half-plate camera softly packed in its case, and the latter fastened to my cycle, I started off for the country, where I had an appointment to photograph a large group of men. On arriving I was chagrined beyond measure to find that the focussing-screen had by some means been broken into fragments. I could not account of this, having carried the camera in the same manner for over five years. Nevertheless, the glass was well and truly broken, and to make matters more difficult, the men were all ready and waiting for me—this, too, being unusual. My first thought was to inform them of what had happened, and make another appointment, when, to use an up-to-date term, a brain-wave suddenly seized me. I quickly took a half-plate out of the dark slide, washed off the film with hot water, then rubbed over the clean glass with a piece of soap, and working it with the end of the finger, until the whole was evenly covered, and with my penknife I took out the two small screws in back of camera, and soon had my home-made screen in position. Indeed, the whole thing was done so quickly, that few of the men knew that anything had happened, and for myself the situation was saved. I may add that the results were so satisfactory that I am still using the same focussing screen until I can obtain a new ground glass, which is not too easy at the present.—E. S.

A Useful Stump from Elder Wood.

When a retoucher is enjoying a week-end ramble on the country-side, he or she should cut a stick of elder for making a pith stump. It may remind some of their boyhood days when they made pop-guns and whistles from elder stems, and now it is hoped it may add interest and pleasure to their work to try it as a new tool.

Select a stick one year old, as that will contain the most pith, and from this select an internode about five inches long. With a sharp penknife carefully cut the wood away in strips, leaving a stick of pith which may be half inch thick. Leave this on a shelf to be air-dried, and away from the sun for a day. Then wrap it round with a couple of turns of paper three inches wide to strengthen the stump, leaving one inch free each end, and fastening with paste. Next, with the sharp penknife make one end blunt stump fashion, and the other a finer point. Finally, a delicate rub on fine sand paper will give it as smooth a finish as one may wish.

This makes a neat, light tool for applying Baskett's reducer with a velvet-like smoothness. The blunt end may be used for general purposes, and the other trimmed any shape to suit the job in hand, which is the special advantage it has over washleather. It can be easily cleaned if necessary on sand paper, and does not get stiff or useless. If great pressure is not applied the stump will last a considerable time, and should it break one end can still be used in a portcrayon holder.

The French artist, Girardot, was the first to recommend the pith of elder stems to pastellists as softer and yet firmer than an ordinary stump.—BURLINGTON.

Minor Repairs to Apparatus.

HOWEVER much care is taken, small screws holding loose fittings, struts, etc., on a camera are apt to work loose and come out, due probably to less well seasoned wood being used in some parts than others. I have found that it is useless to put these in again in the ordinary way, and when this happens adopt the following simple plan:—A fragment of mahogany is taken and shaved off with a sharp pen-knife, so that it is a tight fit in the hole. This is "seccotined" and driven in, and put aside for the adhesive to get hard; this takes some hours. The projecting end is then cut off flush with the wood and the screw re-inserted; as a precautionary measure this may also be lightly "seccotined" as well. Work done in this manner may be regarded in the light of a permanent repair. Metal cameras are less trouble in this respect, but I have repaired the nuisance caused by loose screws simply by coating the latter with the Seccotine prior to putting them in, and some treated in this manner some months ago have been no trouble since. Shaking or loose-fitting struts on a field camera can be made to hold much firmer by means of a couple of copper "burrs" such as are used for rivetting. These are slipped on one each side of the strut before the nut is screwed on, and will be found to have a decidedly good effect upon its rigidity. In course of time the metal points of the tripod become worn, and the result is that the legs are apt to slip, especially upon a smooth floor. Much of the trouble and annoyance in this respect may be saved if the points are simply filed sharp again by the operator, filing from four sides, so as to get the original shape favoured by the maker. I have found that a round point is far more likely to slip than one of a pyramid shape.—EXPERT.

Keeping Sulphide.

I HAVE found by experience that a very convenient and handy method of keeping the sulphide bottle air-tight is as follows:—After having fitted an ordinary cork of such a shape and size that it can easily be withdrawn with the fingers, procure a penny stick of Plasticine (any colour) and mould into a flat circular cake about ⅛ in. thick. Put this on the cork, press, and mould round the sides of the bottle after the manner that ordinary metal capsules are put on bottles. This makes the bottle perfectly air-tight. When the sulphide is wanted, the Plasticine can be very easily rolled off and as easily put back again. It fact, it is a pleasure to use, as the Plasticine lasts indefinitely and keeps the sulphide in splendid condition.—DERBYSHIRE.

AN INDEX OF SCIENCE AND TECHNOLOGY.—It may be remembered that the *Athenæum*, which in the early days of photography was largely a medium for the interchange of information on the new process, has during the period of the war usefully directed its organisation to the issue of a series of indexes by which the average reader is provided with the means of referring to articles, papers, etc., on practically any subject in which he may happen to be interested. The series of indexes cover a wide field—from sports and games to theology and philosophy. That which now reaches our table is the index dealing with science and technology, and providing a key to subject-matter in this branch of literature to be found in periodicals during the year 1916. Many things have delayed its publication, but work of this character requires to be done by people who are none too easy to find, and we all know the difficulties which of late have been experienced in the production of printing. The compilers are therefore to be congratulated on the production of this volume of 160 large pages, within which the student who is interested in any given branch of science or technology can see for himself what references in the periodical literature of 1916 he may wish to look up. The work has evidently been done with very painstaking care; in many instances reference is made to several periodicals where the same matter has appeared in each. The volume is issued by the *Athenæum*, Breams Buildings, Chancery Lane, London, E.C.4, price 10s. net.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Optical Projection Lantern.—No. 114,460 (March 29, 1917).—The invention relates to a form of electric lamp, and optical system to be used where a beam of light is required in a concentrated, or parallel form. The bulb is so constructed that the source of light is situated in a projection upon the main bulb and not within a narrower part of an oval-shaped bulb as heretofore, which projection can be made much smaller for a given candle-power than would be possible in an ordinary spherical bulb and has no constricted or baffled opening, the extra space afforded by the main part allowing a circulation of the contained gas which keeps the whole comparatively cool.

The part containing the illuminant being thus small, allows a correspondingly small reflector to be used with it, as only the projecting portion of the bulb is within the reflector, and thus the whole apparatus is reduced in size, while the main part of the bulb being outside the reflector further reduces the heat of the bulb by radiation being more free. In order to allow the circulation of the contained gas to be as free as possible the bulb is intended to be used in a vertical position with the projection at the lower end. With a bulb so situated the best results are to be attained when the reflector is placed so as to direct the beam of light it controls vertically downward or nearly so.

The reflector may be ellipsoidal, or paraboloid in form or approximating thereto, and is perforated at or near the apex with a hole of sufficient size easily to admit the projecting part of the bulb.

As the ray will usually be required to be more or less horizontal, a mirror is placed at such an angle in the beam as to reflect it in the direction required.

This mirror may be plane, convex, or concave, as may be suitable for the purpose of the lamp, and for the position of the mirror.

In the case of an ellipsoidal reflector a concave mirror will usually be found most serviceable beyond the second focus, where it converts the divergent beam into a less divergent, parallel or convergent beam according to its depth of curvature, and its distance beyond the focal point.

As the position of the plane mirror has no effect beyond altering the direction of the beam it may be placed in any position which satisfies the mechanical requirements of the device in which it is employed.

Similarly from an optical point of view the position of either a curved or plane mirror is of far less importance with a reflector which affords a parallel beam than with a converging one, so that in the case of the paraboloid, the mechanical considerations can decide.

Where in the practical use of this device it is needful to vary the angle between the incident and the reflected beam, the mirror should be pivoted so that it moves upon an axis which in the accompanying drawings will be in such case normal to the plane of the paper. It is generally preferable that this axis should pass through the point at which the central rays of the beam strikes the mirror.

In the accompanying drawings, figure 1 shows the special bulb with the reflector in place, and the mirror above the second focus, the mirror being plane, and the lens L so placed as to yield a parallel beam. The bulb is formed with a large portion or compartment B and a smaller portion or compartment B¹ the two communicating, the walls of the portion B¹ being parallel to avoid any contraction of the meeting edges of the two portions B, B¹ and thus allow of free circulation of the contained gases.

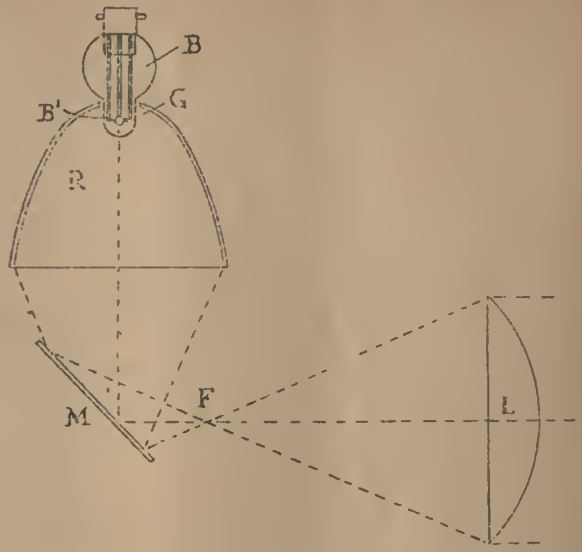


Fig. 1.

G is the incandescent filament or globule positioned in the smaller compartment B¹, R is the reflector (in this case ellipsoidal), M the plane mirror, F the second focus and L, as already stated, the lens.

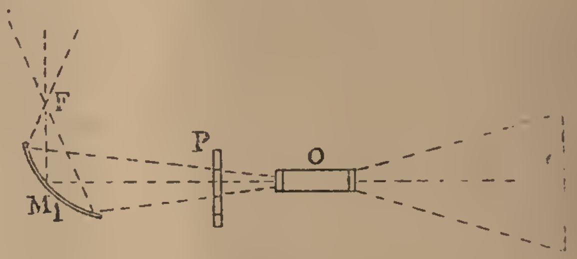


Fig. 2.

Fig. 2 shows the combination to be used for optical projection, the bulb and reflector being omitted, here F is the second focus, M¹ a concave mirror, P the lantern slide or gate to carry the film, and O the objective which focusses the picture upon the screen S.

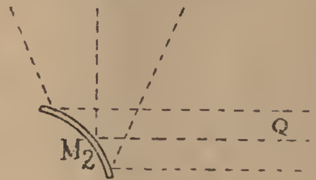


Fig. 3.

Fig. 3 shows a convex mirror M² placed above the focal point, and projecting a parallel beam. William Thomas Coulson, 33, Jasmine Grove, Anerley, London, S.E.23.

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Samples of Dry-Mounting Tissue.—As will be seen from their announcement on another page, Messrs. Houghtons, Ltd., 88/89, High Holborn, London, W.C.2, are offering during the next few days to send a sample of the Ensign dry-mounting tissue, which they are immediately putting upon the market, to any professional regular user of this material. Application should be made without delay, as the supply of tissue for the purpose is limited.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SATURDAY, MAY 18.

Hanley Photographic Society. Outing to Trentham.

MONDAY, MAY 20.

City of London and Cripplegate Photographic Society. General Meeting.

TUESDAY, MAY 21.

Sheffield Photographic Society. "Holmesfield—Its Halls and Manor Houses." J. R. Wigfall, A.R.I.B.A.

WEDNESDAY, MAY 22.

South London Photographic Society. "Table-top Photography." E. W. Brooks

THURSDAY, MAY 23.

Midland Photographic Association. Annual General Meeting.

Hammersmith (Hampshire House) Photographic Society. "The Seasons of English Gothic Architecture." H. H. Wrench.

ROYAL PHOTOGRAPHIC SOCIETY.

MEETING held Tuesday, May 14, Dr. G. H. Rodman in the chair.

The Chairman briefly outlined the circumstances which had led to the establishment of a Hurter and Driffield memorial lecture to be delivered every second year and to form, in conjunction with the publication of their collected papers and the preservation of their original manuscripts and apparatus, a permanent memorial to these two investigators.

Mr. W. B. Ferguson, to whom the invitation had been made to deliver the first of the Memorial Lectures, took as his subject "The Early Work of Hurter and Driffield." He made his discourse a most interesting and luminous exposition of the experimental work and lines of thought which Hurter and Driffield pursued during the fourteen years which preceded their first paper of 1890. During these fourteen years the two friends and collaborators devoted the whole of their leisure towards the establishment of photographic practice upon a scientific basis. Driffield was the partner with the practical knowledge of photography; Hurter, the chemist and mathematician, to whom the chaos of photographic work in the 'seventies and eighties as regards exposure and development of plates was repugnant. The joint labours of the two were undertaken in the first place purely for the end of providing a rational and effective basis for the correct exposure of plates. In entering upon this task, as Mr. Ferguson illustrated, they were two pioneers in a great country who gradually found their objective receding from them, and were led to enter an altogether wider and more profound field of work.

The great merit of Mr. Ferguson's discourse—and it is one which will make it a permanent piece of photographic literature—was its searching analysis of the stages by which Hurter and Driffield progressed from the very first days of beginning their experiments. The lecture represents an enormous amount of study of the copious note books and correspondence of Hurter and Driffield during this early period. Mr. Ferguson was fortunate in showing his audience reproductions of the passages and drawings in Hurter's notebooks, by which his aims and course of reasoning were thrown into relief. It is worthy of note that their preliminary work was entirely on the measurements of the actinic value of daylight. They first attacked this question by means of a primitive form of actinometer, and subsequently expanded these observations by calculations based on the data of the altitude of the sun. From the strength of light they proceeded to find a numerical value for the "slowness" of inertia of a plate, and this at a time when the now familiar idea of "speed" of a lens, as measured by its *f* value, was unknown. From these considerations they passed to the adoption of a numerical standard of "slowness" of a plate, and thence by a natural process of transition evolved a slide rule exposure calculator, subsequently modelled in the "Actinograph."

It was as a result of these lines of inquiry that they were led to investigate the law connecting the exposure which a plate receives and the density of silver deposit thereby produced upon it, and from this, chiefly through the mathematical genius of Hurter, to formulate the whole series of conceptions of density and density curves which has been the foundation of all scientific methods of photographic investigation since then.

Mr. Ferguson exhibited the apparatus actually constructed and used by Hurter and Driffield for their experiments, and referred to the very primitive character of the appliances which they employed for all the researches which were embodied in their paper before the Society of Chemical Industry in 1890. It was not until their later work was undertaken that they constructed and devised more elaborate instruments—for example, the rotating sector disc for the making of graded exposures.

On the proposition of the President, seconded by Mr. F. F. Renwick, a hearty vote of thanks was accorded to Mr. Ferguson by acclamation.

CROYDON CAMERA CLUB.

MR. G. ARDASEER, F.R.P.S., gave a lantern lecture on "Curiosities Seen through the Microscope," which aroused much interest in the larger oddities (*vide* "Piffle") comprising his audience. The lecturer is one who has the happy knack of combining the popular and scientific in a harmonious blend, and errs wisely on the side of not extending his subject beyond a pleasant hour. Scientific appellations were discarded so far as possible, but when the poor beast had no other name, mouth-curdling designations were unavoidable.

His preference is for small and minute denizens of sea and fresh water, and many examples were shown. One slide of a fresh-water flea in graceful pose rivalled any of Miss Maud Allan's, and several slides illustrated such weirdness of form as to be potentially capable of knocking any Futurist sideways. The evolution of the gnat was traced in detail, and he said it is the lady gnat, like the female tsetse fly, which is the one that stings. Therefore watch for any coquettish expression, and act instantly. The little wriggling eels, causing sleeping sickness, injected by the latter, were shown on a large scale. It also transpired incidentally that one fool of a fly takes about two years to reach its final perfected stage, and then lives for one day precisely. It is a pity the house fly does not behave similarly, for Mr. Ardaseer gave it a wretched character, and it ought only to be seen to be destroyed on approved Hun and cathedral principles.

Judging from the lecturer's remarks, it appears that he does not favour the "barnacle-goose" theory, despite woodcuts of hoary antiquity, but who but a thorough goose would think of hanging by its head and kicking food into its mouth, which is precisely what the barnacle does. Some very curious slides were also shown, depicting photographs taken through the eye, or myriad eyes, of a water beetle. The cross of St. Paul's, looking a bit groggy; Sir William Abney, appearing far from well; and an old lady past the century, but looking any age you please, were repeated in hundreds of circles, beating a multiple back, or postage-stamp camera, into fits. Altogether, a delightful evening, and members will look forward to a promised return visit. A most hearty vote of thanks was accorded the lecturer.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—On Monday, May 6, Mr. E. W. Taylor demonstrated his method of "Enlarging without a Condenser." He remarked that he had had two artificial light enlargers in his time, but had discarded both in favour of the much more satisfactory method of enlarging by the aid of a paraboloid which he had made to fit his camera. This, he claimed, when used in conjunction with magnesium ribbon, produced results which for quality could not be surpassed, and had the advantage of requiring a short exposure. With the ordinary artificial light enlarger an exposure might run into several minutes, but with his method the length of the exposure was only a matter of a very few seconds, and never varied so far as the actual time involved was concerned.

If a negative is unusually dense it is only necessary to increase the intensity of the light, or if very thin, to reduce the light passing through the lens by using less ribbon or by stopping-down and using a smaller aperture.

There was, however, one better source of light—viz., daylight—but that, unfortunately, was uncertain, and as the light-value might alter between the time of making a test strip and the enlargement, it is necessary to adopt a more certain source.

Standardised, or controlled light, was the basis of his method. For instance, one strip of magnesium ribbon will provide exactly one-half the amount of light of two strips of a similar length, and the worker could, therefore, increase or decrease the strength of the illuminant to suit varying classes of negatives.

With the ordinary enlarging lantern it was difficult, in fact, almost impossible, to obtain good enlargements from negatives in which there is a dense high-light: this is invariably reproduced as a chalky mass, devoid of detail and gradation, moreover, any handwork on the negative would show in some degree.

The method he used had this advantage, as far as the quality of the enlargement was concerned: handwork on the negative applied by either brush, pencil, or knife did not show in the enlargement, and the intensity of the light reproduced in a most remarkable manner all the gradation and detail present in the negative. Moreover, chalky high-lights would never occur where the exposure was correct.

The apparatus he used was home-made, and could be produced for a few pence in cardboard. If made in tin, it would, of course, last a lifetime, but a cardboard paraboloid would last at least six months even if in constant use. The apparatus consisted of a large wooden box, of the Tato sugar variety, set up on end, with an opening cut in the bottom to fit the back of the camera. The negative was placed in a carrier made to fit the camera, in place of the usual dark slide.

After placing the negative and camera in position, a small lamp was put behind the latter to facilitate focussing. This, Mr. Taylor explained, was the only weak point in his method. Focussing was difficult, but he usually used a very much brighter light.

After focussing the image, the lamp was removed, the paraboloid placed inside the box, and three strips of magnesium ribbon, sufficiently long to reach from the top of the paraboloid to within an inch of the base, were bound together at the bottom end and inserted through a hole in the wooden box into the paraboloid inside. The bound pieces of magnesium ribbon were held in a pair of pliers, which were kept close by a strong rubber ring. The whole apparatus was covered over with a black focussing cloth pinned along the front of the box and allowed to fall down over the back so as to enclose the paraboloid and prevent the escape of light.

The ribbon was ignited through a hole in the side of the paraboloid under the shelter of the focussing cloth, no light reaching the bromide paper except through the lens.

Exposure did not exceed five seconds in duration, but the enlargement, upon being developed, fully justified all that the lecturer claimed for his method, namely, freedom from appearance of handwork and ample gradation in the high-lights.

Combination printing, such as the printing in of clouds, was then demonstrated, Mr. Taylor securing the services of a member to light the ribbon, while he did the usual shading with a piece of opaque card. The result in this instance was still more remarkable, there being nothing to indicate that the resulting picture was not a straightforward enlargement from a single negative.

It was mentioned that, should one have to enlarge from a negative considerably denser at one end than at the other, it was then advisable to place the densest side nearest the ribbon, as there was slightly more light in that part of the paraboloid. If there were any possibility that this might show in a finished enlargement from a fairly even negative, a similar piece of ribbon should be burnt in the opposite side, to equalise the light. If this were done the quantity of ribbon should be equally divided between the two sides.

Three pieces of magnesium ribbon, about six inches in length, were found to be sufficient to give a fully exposed 12 × 10 enlargement from a fairly dense ¼-plate negative at *f*/8.

The paraboloid should be lined with white blotting or cartridge paper.

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Eagle Developing Tanks.—The Eagle Tank Company, 15b, Cank Street, Leicester, sends us a copy of the fifth edition of its price-list, in which will be found particulars of various patterns of tank, together with numerous extracts from the letters of those who have adopted these tanks in their studio work.

News and Notes.

Anti-Dewing Preparation.—Under the name of "Clarocit," Messrs. Griffin's, Kingsway, London, W.C.2, have just introduced to photographic users a preparation designed for the purpose of preventing condensation on condensers, lenses, lantern slides, and other glass surfaces which in ordinary working conditions are liable to the deposition of moisture from the atmosphere. The preparation consists of a dark stiff cake which is applied simply by rubbing a moistened rag upon it, then rubbing the rag over the glass surface, and finally polishing off the traces of deposit. We have subjected the material to a severe test in the form of exposing it to the aqueous vapour rising from a vessel of warm water, and found that a piece of glass one half of which was treated with "Clarocit" resisted the deposition of a film of moisture, while the untreated half was immediately "dewed." On longer exposure, naturally both halves received a deposit of moisture, but the test is sufficient to show that under the conditions in which lantern condensers and lantern slides are used, "Clarocit" can exert a very considerable action in the way of preventing a deposition of the dew. Messrs. Griffin's supply it in cakes, price 2s. 6d. each.

The Wellington Handbook.—It is satisfactory to find that the high cost of paper and printing has not restrained Messrs. Wellington and Ward from re-issuing their handbook on the exhaustion of the previous edition. The present manual of negative-making and printing—for that is what it is—has, moreover, been considerably revised in accordance with experimental work which has had some results which will be welcomed by users of Wellington plates and papers. For one thing, the several different formulæ for the M.Q. developer, previously recommended—one for plates, another for bromide paper, and so on—have been replaced by a single formula which may be used for the development of all the firm's plates and papers, and is found, moreover, to yield results which, if anything, are better than those previously obtained by the special formula. Another new feature of the handbook is the prominence given to a borax M.Q. formula of particular service for the development of such small plates as those of the vest-pocket size, on account of the very fine grain of the image. The handbook in its new edition also contains a chapter dealing fully with the methods of producing bromoil and bromoil transfer prints, for which the recommended bleacher is one of copper sulphate, bromide, and bichromate, which does not require a subsequent acid bath. Further comment upon a volume which is surely well known to both professional and amateur photographers may be dismissed by saying that as a practical guide to the making of negatives and of prints, by contact and enlarging, it would be difficult to find a text-book which deals more directly and clearly with everyday processes and difficulties. The book is issued at the price of one shilling, but a copy may be obtained free from any *bonâ fide* professional photographer who will apply to Messrs. Wellington and Ward, at Elstree, Herts.

Correspondence.

PHOTOGRAPHY *v.* HAND WORK.

To the Editors.

Gentlemen,—A slip of the recently presented fountain-pen is probably the cause of the versatile reporter of the Croydon Camera Club making it appear in your current issue that at a recent demonstration at this Club on "After-work on the Print" I stated that if results could be secured by purely mechanical means it was so much the better. What I definitely stated was that "if the required results could be secured by purely *photographic* methods it would be infinitely better and far less trouble than any that could be obtained by after-work on the negative or print."

Furthermore, it would have been obviously unfair to the many beautiful examples of pure photography for me to have stated that I had never seen a straight print that could not be improved, etc. What I intended to imply was that it was unfortunately only too infrequently that such prints were seen.

Trusting you will permit this correction of an otherwise excellent report.—Faithfully yours,

G. C. Weston.

POTASSIUM VERSUS SODIUM BROMIDE.

To the Editors.

Gentlemen,—The thanks of all photographers are due to you, and also, I believe, to Messrs. Johnson and Sons, for making an authoritative statement concerning the use of sodium bromide in place of the potassium salt in photographic operations. We have looked and relied upon potassium bromide for so many years, and it has served us so well, that many have looked upon sodium bromide as a sort of interloper, or one of the many substitutes so fashionable, if not absolutely necessary, nowadays.

Photographers in my little circle heard whispers of the efficacy of sodium bromide some time ago, and after using it experimentally came to the conclusion that it was not up to expectation and did not quite take the place of potassium. Such findings, however, must have been at fault, owing no doubt to an element of prejudice which existed. Your "Ex Cathedra" remarks on page 201 therefore come at an opportune moment, and give one some encouragement to use the cheaper and more easily obtainable sodium bromide, and to use it with confidence.

In discussing the matter recently with a chemist historian holding a good position with a firm of manufacturing chemists, he threw an interesting sidelight on the subject, and if his statements are founded upon facts, as I believe them to be, they show up to a marked degree the extraordinary proclivities of our friend the enemy, whose chemists have ever been to the fore.

I have been given to understand that although the use of potassium bromide in photography is almost, if not quite, as old as photography itself, the salt was not largely used, neither in medicine nor photography, until shortly after the Franco-German War, at which time it became more plentiful and cheaper than before. Apropos the latter point, potassium bromide cost 5s. per ounce in 1845. The salt, however, did not become really cheap, properly boomed and plentiful, until the Germans had obtained possession of the rich potassium fields of Alsace-Lorraine. It was then that potassium salts were "run" for all they were worth, and to the detriment of the sodium salts which were mainly of English origin. Eventually, as most of us know, Germany became the centre of the potassium trade: hence the extraordinary scarcity of bromide, ferricyanide, and other potassium products during the early days of the war.—Yours faithfully,

C. M. Beaverstone.

AMERICAN AND BRITISH PHOTOGRAPHIC JOURNALS: TANK DEVELOPMENT.

To the Editors.

Gentlemen,—May I be permitted to comment, very briefly, upon two letters published in your issues of April 12 and April 5, just received.

In that of April 12 Mr. Alfred Cory makes the statement that: ". . . in the United States to-day there is not one photographic periodical wherein a scientific article pertaining to photographic theory or practice can be presented to advantage. This is no reflection on American photographic editors, but rather upon the unanimous policy of the American photographic press to exalt the psychic mysteries of 'fuzzytype' in preference to the fundamentals of the photographic process. There is no rancour in this statement, as I have had no dealings with the American editors of photographic periodicals, I merely judge them by their respective publications."

This remarkable statement is made by Mr. Cory as the finale of a paragraph of praise for the "British Journal of Photography" on the value of its technical information.

While yielding to no one in my appreciation of the "B.J." as easily the most interesting and satisfying of journals devoted to photography available to English readers, I am compelled to protest that Mr. Cory misjudges the American photographic press; and as an American brother editor, I venture to offer the apologies of the American photographic press for his ignorance in the matter of which he speaks.

The American photographic press most assuredly has no "unanimous policy to exalt the psychic mysteries of 'fuzzytype,'" etc. I have positive knowledge of the fact that they have a proper appreciation of the foolishness of the aforesaid mysteries, as well as of the 'fuzzytype,' and wholly prefer "the fundamentals of the photographic process" as material for publication.

But the editors of the American photographic papers, like their brother editors in England, are largely dependent upon their readers and workers in photography for the material with which to fill their papers. And I have positive knowledge that they do not receive and cannot obtain any adequate supply of the sort of technical information which Mr. Cory would fain see in their journals, and which the "B.J." does receive and publish throughout the year.

There is another reason for the paucity of advanced technical information in our American photographic journals. We have not here any weekly or monthly journal with anything like the "contents capacity"—so to speak—of the "B.J."; so that no American photographic journal could hope to compete with the "B.J.," even if it received or could obtain a constant supply of the sort of technical information of which Mr. Cory speaks. Knowing this, the comparatively few workers on this side who from time to time supply advanced technical information (many of them Englishmen by birth and technical training, by the way), send their papers direct to the Editors of the "B.J." as the simplest and surest way of securing publication.

Let there be no mistake about this. I am not apologising for the American photographic press, nor offering excuses for its shortcomings; but simply protesting against Mr. Cory's misjudgment—based, as always, upon plain ignorance. A survey of the American photographic papers covering the last fifty years will show that they have not been remiss in presenting a goodly volume of "technical information concerning the fundamentals of the photographic process." And this despite what is written in the preceding paragraphs. If Mr. Cory will send to the editors of our American photographic journals some of the excellent technical papers he is at present contributing to the American motion picture press (just as this sort of matter is sent to the "B.J." for the credit of publication) I venture to suggest that he will find his brother editors more than willing to publish what he sends. One cannot make bricks without straw.

It should be remembered, further, that the "B.J.," by reason of its age and standing as a photographic journal, has in its following a very large body of advanced photographic workers all over the world; whereas we have not in the United States as yet sufficient photographic workers of this class to justify the publication of so large a proportion of technical information in any existing journal on this side.

As a friendly parting word to Mr. Cory, may I add that the technical information relating to this fundamental photographic process, as well as many other papers concerning notable advances in other fundamental photographic processes, have been first "presented to advantage" in the pages of photographic periodicals published in the United States.

Turning now to the letter of Mr. A. E. Stanley, on page 163 of your issue of April 5, I find this extraordinary statement: "Tank work (development), of course, is a question of fixed temperature and fixed time, *without examination*." Of course, it is nothing of the sort. Has Mr. Stanley not heard or read of the open tank method of development for plates or flat films, due to the introduction, some years ago, of the Core Developing Rack? This method is fully described in the *Photo-Miniature*, No. 168. It has been in use in American portrait and commercial studios for years. It enables one man to develop, fix, and wash from one to two hundred plates per hour, and gives perfectly clean negatives of excellent printing quality for any paper desired, without spots, air-bells, streaks, uneven development, or any of the other troubles which Mr. Stanley says he encountered in his experience with tank development. This much I say about the method, not from any desire to advertise the *Photo-Miniature*, but because I have seen the method in practical operation in several large studios, and am convinced that Mr. Core's invention and method of working with open tanks gives us the perfect method of developing negatives, taking into account the formula and the time and temperature of development as properly co-related, and at the same time permitting of examination of the negatives during development, and endless variation of the result in the proper way.

In the use of this method there is no excuse for air-bells or any other defect of the sort. They can result only from slovenliness, carelessness, or mistake on the part of the worker. It embodies every good point mentioned by Mr. Stanley in his description of the ideal tank development method, and represents the biggest advance in practical photographic manipulation during the last twenty-five years.—Yours faithfully,

John A. Tennant,

New York, May 4. Editor, *The Photo-Miniature*

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

M. B.—We are informed by the Air Ministry that application for the Photo Section of the Flying Corps should be made to the reception depot nearest the applicant. In your case this is at 8, Tyndall's Park Road, Bristol. The full list of addresses of these reception depots was printed in the "B.J." of May 3, p. 207.

PREPARING SELF-TONING PAPERS.—Could you kindly inform me if there is any preparation applicable to glossy self-toning paper, to enable it to take, when printed, etc., a watery solution of an aniline colour (such as silken-yellow)?—E. J. M.

We presume you mean glossy self-toning collodion paper, which unfortunately for its admirers resists water-colours and dyes. We suggest you varnish the print with gum arabic as supplied for artists' use. This ensures an even glaze, and, when dry, carefully lay your dye solution on the gum. For some effects try rubbing over with gum, and add while wet various tints, letting them blend by running into each other. For aerograph work on glossy collodion, the B.J.A. receipt of quillaia and spirit is as good as any.

J. G. MARSHALL.—The proportions of your studio are very good, and quite large enough for groups of twenty or more. A few feet more in length would have been an advantage. A darkish grey or sage green would be suitable for the walls. If these are too light, you are likely to get flat negatives when the sun is on the glass. At such times you want thin, clean white blinds all over the glass, no clear glass showing. If you do not wish to work the half watt lamps in conjunction with daylight, we advise you to fit them on the dark side of the studio, otherwise you might fix them upon a moveable stand. Six 1,000 c.p. lamps seem to be the most economical installation, as the light is better distributed than by using fewer high-power lamps; also you can control the lighting by having separate switches to each lamp.

J. G. MARSHALL.—1. No, the printer is made only in the one (cabinet) size. For larger negatives, you would probably find it best to get a rapid printing and vignetting box made on the lines of that described on page 313 of the current Almanac, and in "B.J.," March 30, 1917, page 161. Though for single prints, it ought to be rapid enough, as there is not much advantage in printing whole plates 6-on, or even 3-on. 2. There is no better method of matting plain glass than by grinding. If you work with a rubber in the shape of a flat lead block and use F.F. carborundum powder, it is not such a tedious job. Failing a lead rubber, use a small piece of flat glass cemented to a convenient handle. In either case finish off (for fineness of grain) with the F.F. powder on a rubber of cork.

A. M.—You are unnecessarily anxious on the subject of your query. Broadly speaking, any pictorial effect which you get in a negative (intended for printing or enlarging) will not be out of place in a lantern slide—that is to say, unless it is something very extreme in the way of diffused definition of the distance. But, as a matter of fact, with a quarter-plate lens working at, say, f/8, it is not easy in the case of most outdoor landscapes to get such a degree of out-of focus. In other words, if you have a good negative for a print you have one for a good lantern slide. Diffusion which is too much for one will be too much for the other. You seem to have the idea that the definition in a lantern slide should be exceptionally sharp throughout all planes, but that is as unpleasant on the lantern-screen as it is in the print.

J. S.—In the first place, the ordinary pattern of half-watt lamps is very unsuitable for use with a condenser, owing to the large area occupied by the filaments. You may be able to obviate this, at the expense of cutting down the intensity of the light, by fixing a diffusing screen as close in front of the lamp as you can. We suppose, by the way, that you are aware that a horizontal position is a very bad one for a half-watt lamp, as it leads to the deposition of the volatilised filament not in the neck, as the design of the lamp intends, but in the bulb itself, which thus becomes obscured in the course of time. Probably the second cause of your difficulty is small aperture in the projection lens. A 12-in lens has rather a short focus for a 12-in. condenser. 18 ins. would be better, and if the lens were of the same f/ number it would, of course, then have a much larger actual aperture. A large light-source like your Osram lamp specially calls for a large aperture in the projection lens. If it was an arc lamp or a focus filament lamp (not now obtainable) a smaller aperture of lens or a shorter focus would not matter very much. We should say your best course would be to replace the half-watt lamp by a small arc of the semi-enclosed pattern, such as that supplied by the Westminster Engineering Company.

Commercial & Legal Intelligence.

EASTMAN KODAK COMPANY.—The directors have declared an extra dividend of 10 per cent. on the common stock of the company, payable August 1 to stockholders of record at the close of business on June 29.

LEGAL NOTICE.—Notice is given that the Dean Engraving Co., Ltd., and the Whitefriars Studio, Ltd., have been struck off the Register of Joint Stock Companies, and are dissolved.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less	1/-
Extra words	1d. per word.

(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

"Box No." and office address	charged as 6 words.
For forwarding replies add ...	6d. per insertion for each adv't.

If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 3029. Vol. LXV. FRIDAY, MAY 24, 1918. Price Twopence.

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SUMMARY.

Some of the anomalies and discrepancies which beset the question of percentage solution are the subject of a leading article, from which it will be seen that the chief cause of confusion is the want of correspondence between the sub-divisions of measures of weight and measures of volume. (P. 234.)

It is announced that the "Amateur Photographer" has been acquired by Messrs. Iliffe from Messrs. Hazell, Watson, and Viney, together with the latter firm's photographic publications. The "Amateur Photographer" is to be combined with "Photography and Focus." (P. 242.)

Edinburgh photographers have organised a co-operative scheme of closing their studios from August 21 to September 2, and of advertising the fact jointly beforehand. The establishment of an "Edinburgh Society of Professional Photographers" is also announced. (P. 243.)

Natural-colour photographs are to be figured in an Australian War Exhibition which opens to-morrow at the Grafton Galleries, New Bond Street. (P. 242.)

Some interesting experience as to the scale of reproduction most suitable for showing goods like lace or watches in printed advertisements has recently been quoted in an advertising journal, where also is described a somewhat original method of touching up embroidery which is being photographed for photo-engraving. (P. 234.)

A contributor makes a very strong plea for the consideration of a souvenir set of home photographs, which might be supplied under the title "Book of the Home." Suggestions are offered as to the subjects which might be so included and appropriate methods of dealing with them. (P. 236.)

Chinese white water-colour supplies a handy means of touching-out black or coloured spots on white mounts. (P. 239.)

Attention needs to be directed to the Order, now of some standing, by which the use of any kind of illuminant for lighting a shop front is a punishable offence. (P. 233.)

Some hints on the lighting and development of profile portraits are given in a contribution to "Assistants' Notes." (P. 239.)

According to the experience of a large firm of trade printers of postcards, pure tin is the best material for holding the hypo-alum toning solution. (P. 234.)

A broad shoulder-strap will be found to remove a good deal of the fatigue in carrying the photographic outfit. (P. 239.)

Arc lamps, when much used for printing, should be enclosed within a cabinet, so that the eyes of the printer are not exposed to the unscreened rays from the arc. (P. 233.)

Where a dealer or newsagent states that he cannot supply the "B.J.," our publishers will be able to take the matter up if they know the name of the wholesale distributor by whom the retailer is supplied. (P. 234.)

EX CATHEDRA.

Shop-Front Lighting. It would seem from our recent correspondence that one portion of the Lighting, Heating and Power Order of March 26 last is not realised so clearly as it requires to be. The Order is more than a restriction of the general consumption of gas and electric current. It is also a specific prohibition of the use of any illuminant whatever for the lighting of shop fronts, except that it is permissible to use a light for the illumination of a "small sign" indicating to persons outside that the shop is open. It requires to be understood—and this is apparently the point which our correspondents have misinterpreted—that the Order has nothing to do with the hours during which a shop is open: nor has it anything to do with the hour at which blinds must be drawn. It prescribes without any qualification that lights must not be used for a "shop front," defining the latter as "any portion of a shop, or any show case, or other similar device which is ordinarily used wholly or mainly for the display of goods to persons outside the shop." Subject to the approval of a police officer, a light which is necessary for serving customers inside a shop is permissible, even though it may at the same time illuminate the "shop front." There have already been convictions for infringement of the Order, which obviously is one which photographers require to keep before them. Unlike other parts of the Order, the provision as to shop fronts applies to the whole of Great Britain.

* * *

Eyesight and Arc Lamps One or two recent cases which have come under our notice prove that all photographers are not alive to the risk of injury to the eyesight which exists in the incautious use of the electric arc for printing purposes. Not only must care be exercised in looking at the arc itself, but also at the reflections from the surface of the negatives. Electricians usually provide themselves with dark spectacles, but these are inconvenient for photographic work, as they would have to be removed to inspect the prints. The best plan, therefore, is either to use a lamp similar to the Northlight printing lamp, in which reflected light only reaches the negatives, or to use the enclosed arc in a proper printing cabinet, keeping all spaces not used for printing frames closed by means of card or wooden panels; there will then be no need for the printer ever to see the arc or its reflection. Another point in favour of either of these arrangements is that the eye, not being tired by a strong light, is better able to judge the progress of printing, especially with platinum. When printing on platinum or carbon, reflected light should always be used, as the direct arc light has a flattening tendency upon the prints. Negatives which give excellent prints by daylight prove disappointing with the arc. In our own experience the mercury-vapour lamp is the most satisfactory for printing purposes, the time of exposure being about equal to that necessary in good daylight, while the quality of print obtained is excellent. It is worth remembering that the mercury-vapour light, if on a quartz tube, is more injurious to the eyes than the arc, but as such tubes are not usually supplied for photographic work there is little danger. In all cases of injury to the eye by the electric light the effect may not be visible at the time, becoming more apparent on the next day.

* * *

Getting the "B.J." Our publishers' abandonment of the custom in this trade of sending out copies of the "British Journal" on the terms of "for sale or return" has necessarily disturbed the readiness with which the "B.J." had previously been everywhere obtainable. The obvious remedy for any difficulty in obtaining the "British Journal" is to place an order for its weekly delivery until countermanded with the dealer or newsagent from whom it had previously been obtained. In most cases if that is done there will then be no reason to complain that it cannot be got. If there is, our publishers will be glad of the opportunity to investigate the cause. Without going into the steps to be taken for this purpose, it is necessary to point out that the annoyance to a subscriber can be put right only when our publishers know who is the wholesale distributor from whom a local newsagent obtains his supply. On this information being obtained and notified to us, it will usually be possible to say what is the reason why a dealer finds any difficulty in supplying the demand.

* * *

Best Ways in Commercial Photography Some notes which contain a wealth of suggestion for commercial photographers are contained in the issue of "Printers' Ink," the New York journal of advertising, for April 11 last. Their theme is how goods may best be shown in advertisements, which is as much as to say how photography can be best employed for this purpose. One instance serves to show the thought which advertisers take in using the photographic weapon. In showing lace goods it has been found that photographic reproductions the same size as the original make the lace appear much coarser than it really is: after repeated experiments a reduction of from 1-5th to 1-6th (that is 4-5ths or 5-6ths scale) presents lace articles most effectively. Another item of experiment in advertising this same description of article is that of the various backgrounds to be used in photographing lace, one of a chocolate colour gave the best idea of the natural appearance of the goods. The same circumspection in regard to the scale of reproduction has served to show, in the case of watches, that a reduction of 15-16 is the scale of reproduction which should be adopted when it is wished to make the watches look actual size on the printed page.

* * *

—And New Ideas. Evidently, too, the business of making photographs for the illustration of advertisements or commercial catalogues is a branch of work in which the mind needs to be on the alert for methods which shall provide a short cut to the desired end. The writer in "Printers' Ink" gives an instance where a mail order firm engaged in selling embroidery devoted endless pains to the elaborate retouching of handkerchiefs and napkins in order to secure the most finished appearance in the reproduction. Dissatisfied with the best result which could be got by working upon both the photograph and the engraved plate, the idea suddenly occurred to outline the embroidery itself with a soft lead pencil, and to make the photographs from originals retouched in this way. It is stated that the result was better than anything previously obtained, whilst all the costs of retouching and hand-tooling were dispensed with. Where advertisers show themselves so keenly alive to these methods for the most effective display of their goods, it follows that the commercial photographer, whose business now, and still more after the war, is to serve them, needs to cultivate the same spirit of experimental inquiry and constantly to consider which of a dozen different ways is the best for presenting a given article to the average buyer.

* * *

Dishes for Hypo-Alum. Those who use the hypo-alum toning bath on a large scale will perhaps have had their difficulties in finding the best possible receptacle for the toning solution. A dish of enamelled iron is often used for this purpose, but its life is comparatively short, and as soon as the most minute cracks develop in the enamel there is almost certain to be trouble in the way of stains and markings on the prints. On the other hand, large dishes of porcelain or earthenware are not easy to obtain of a given size, and, moreover, as they are bad conductors of heat, make the bringing of the bath to a working temperature a slower process. It may, therefore, be of interest if we state the experience of one of the largest trade printers in the country to the effect that for this particular bath there is nothing better than a vessel of pure tin, made to fit in a container such as a galvanised iron dish. Tin at the present time is, perhaps, the metal which has advanced in price in a higher proportion than any other, but the experience which we have noted may usefully be borne in mind by other printers when the occasion arises for a renewal of alum-hypo equipment.

PERCENTAGE SOLUTIONS: THE PITFALLS OF OUR LOVELY WEIGHTS AND MEASURES.

It so happened that within the past few days two passages in literature issued by leading photographic firms attracted our attention by reason of their discordant explanation of the oft-discussed item of the "percentage solution." Inasmuch as many working instructions issued by manufacturers, as well as text-books and articles in the Press, prescribe the use of solutions in terms of percentage, it seems not altogether unnecessary to undertake the task, which doubtless has been discharged many times before, of expounding the anomalies which are to be met with in this apparently simple question. We do not wish to exaggerate the importance of what we have to say. Even if anybody goes as far wrong as do the writers of the two passages which we quote below, no great harm is done. On the other hand, it is clear that many people do not know what they should do when they are told to make up a solution of such-and-such "percentage" strength. If it is thought worth while by our manufacturing friends to seek to remove these perplexities, it is also worth our while to endeavour to remove the worse confusion which is created by the two passages which we print side by side. Neither of them is a correct guide to the making of a "percentage" solution, and taken together their effect must be to leave the unfortunate student ten times more muddled than before:—

A.	B.
A percentage solution is one in which a unit by weight of a salt is contained in 100 units by volume of water or other liquid. For example, a 10 per cent. solution is one in which 1 ounce (480 grains) is dissolved in water to make 10 ounces (4,800 minims) of solution. Then every ounce of this solution will contain 48 grains of the salt, every dram 6 grains, every 10 minims 1 grain, and every minim (or drop) 1-10 grain.	The difficulty about percentage solutions will disappear if the worker will always bear in mind that 1 fluid ounce of water weighs 437½ grains, which is, of course, equivalent in weight to 1 ounce avoirdupois. It follows that if one-tenth that number of grains—i.e., 43.75 grains—of any ordinary soluble chemical is put into a graduated glass and water added to make up 1 fluid ounce, the result will be a 10 per cent. solution.

We will refer to the errors and the partial truths in these two statements in a later paragraph. Here let us first try to make clear the two quite distinct reasons why solutions of "percentage" strength are prescribed in instructions for photographic work. The first is that "percentage" is simply a short way of saying what the strength of a solution should be, a solution, that is, which is used in the form in which it is made up either as a bath or for the compounding of a bath by mixture with other solutions. In the case of such preparations the photographer needs to know what is ordinarily meant by "percentage" strength. The second reason is rather different. It is that one may be able, by making up a solution of any chemical of definite strength, to save the trouble of frequent weighings of small quantities of that chemical. The distinction between the two motives is surely obvious enough. An alum bath is directed as advisedly of 5 per cent. strength because that is a short way of prescribing the strength of the solution, and, if the photographer understands his weights and measures, applies to any quantity, large or small, of the solution. On the other hand, a 10 per cent. solution of potassium bromide is directed in order that one may add 1, 2, or 3 grains of bromide without the trouble of weighing these small quantities.

It will be seen directly that it is necessary to distinguish between these two modes of use in order to be able to say whether a solution is being correctly made of such and such "percentage" strength. Before showing how this is so, it is perhaps just as well to remark that there is nothing special or peculiar about a "percentage" solution. Percentage is simply a mode of expressing the strength of a solution, unfortunately not a very precise one, but still broadly defined by the word itself—per centum = per hundred, i.e., so many parts of the substance in 100 parts of the solution. Of course, every solution is a percentage solution in the sense that the quantity of chemical dissolved in it can be expressed as so many parts per hundred. The question is what precise meaning, as regards the use of solutions in photographic processes, is implied by the word "percentage," for obviously it can have a series of different meanings which are the result of ringing the changes between volume and weight. It may have the following four significations:—

1. Vols. of liquid	per 100 corresponding parts by weight of solution
2. Vols. of liquid	per 100 similar vols. o solution
3. Parts by weight of solid or liquid	per 100 corresponding parts by weight of solution
4. Parts by weight of solid or liquid	per 100 corresponding volumes of solution

We can dismiss Nos. 1 and 3 since they apply only to solutions which are weighed. While the valuation and sale of solutions by weight is a common practice in the chemical trade, it does not occur in ordinary photographic manipulation. So we are left with Nos. 2 and 4. No. 2 is clearly a very simple conception, namely, the volume of a liquid which is contained in 100 similar volumes of a solution made by mixing the liquid with another. For example, a 5 per cent. solution of formaline is one containing in 100 vols. 5 vols. of the concentrated formaline, or 1 vol. in 20 vols. So long as the same unit of volume is used for the two quantities—ounces, drams, etc.—there can be no confusion is this case. But when we come to No. 4 the matter is not so simple, and as it is a solution made in this way which is the kind commonly used in photography it is necessary to discover just where the discrepancies may creep in. When we say, for example, that a 10 per cent. solution is one in which 10 parts by weight of a chemical are dissolved in water to form 100 parts by volume of the solution, we assume that there is a simple relation between the unit of weight (and its sub-divisions) and the unit of volume (and *its* sub-divisions). In some systems of weights and measures there is this simple relation, but not in others. In the metric system, which owes its existence to the clear spirit of reform which characterised almost every sphere of activity of the French nation at the end of the eighteenth century, there is the acme of simplicity. The litre (1,000 ccs.) is the volume of a kilogramme (1,000 grammes) of water, and similarly 1 cc. is the volume of 1 gramme of water.* But in the case of British weights and measures there is very little of the kind and every occasion for confusion. We have two ounce measures of weight, the Apothecaries of 480 grains and the Avoidupois of 437.5 grains. The fluid ounce is the volume of 1 Avoirdupois ounce of water, but is divided into 480 minims, so that a minim does not correspond with a grain as a cc. does with a gramme. There is no unit of fluid measure corresponding with the Apothecaries ounce. The two ounces (of weight) are the cause of some of the confusion, but the chief cause is the non-correspondence of the sub-divisions of the Avoirdupois ounce and the fluid ounce.

From what has previously been said the reader will see the way in which this want of correspondence is the cause of the uncertainty in deciding what is a percentage solution. But also it will be clear that directions in text-books etc., can be correctly carried out if regard be paid to it. For example, if one is told to make a solution of, say, 6 per cent. strength to be used as such by itself or in admixture with another solution, the proper course is to use the fluid ounce and the Avoirdupois ounce, i.e., to dissolve 6 ounces in water and to make it up to 100 fluid ounces; or 1⅕ ounces to make 20 ounces (the same fraction of solid and liquid). If, on the other hand, only a very small quantity of the solution is wanted, it can be borne in mind that a 1 per cent. solution is strictly 1/100th ounce Avoirdupois dissolved in water to make 1 ounce fluid, that is, 4.4 grains per ounce. So that a 6 per cent. solution is six times as strong = 26.4 grains per ounce.

But if, on the other hand, the object is to make a solution, e.g., potassium bromide, of certain "percentage" strength in the sense, for example, that 10 minims represent 1 grain (10 per cent.) the method must be to use the Apothecaries ounce weight of 48 grains in conjunction with the fluid ounce of water; or to weigh in Avoirdupois ounces and to use 9 ounces 2 drams of water, instead of 10 ounces, to each Avoirdupois ounce of solid; or more simply to reckon that for a 1 per cent. solution (which is to be measured in minims) every ounce of water should contain 4.8 grains of the chemical.

As we have already said, the actual error which is incurred by neglect of these differences is not really a material one. The motive which has prompted us to deal with the subject at the above length is that many people, as our correspondence shows, put themselves to a good deal of trouble in order to be satisfied that they are following instructions correctly. In doing that they are of course not assisted by conflicting statements such as those we have quoted. It should now be clear that the error in A (apart from the first sentence which is meaningless) is that the writer is assuming that all measurements are made in minims, although he does not say so. On the other hand the directions given in B apply only when the solution is measured in ounces.

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* Leaving out of account minute experimental errors of the order of ·02 per cent.

THE BOOK OF THE HOME.

In these days there is scarcely a single branch of photographic work which can be said to be neglected by photographers generally. Yet there is one which it seems to me has received very little attention, and certainly has not been by any means developed to the extent that might be done, by means of good specimens, judicious advertising (more especially in the form of booklets and folders), and most of all by what is known to advertisers as good "selling talk" on the part of photographers and their receptionists.

The gigantic success of the "Snapshots From Home League" must have come as a great surprise to many photographers, who were often inclined to sneer a little at the productions turned out by the enthusiastic "Leaguers," oftentimes none too sharp, over, under, and only indifferently exposed, finished and posed. Yet, to any of us who have seen these often faulty technical productions taken out of the men's pocket wallets as the greatest treasures they carry with them, prized above faultless studio productions, there must have come some thoughts that give us pause and raise a few questions in even the slowest and densest mind.

Why are they so treasured? Why preferred above studio work, and so hungrily gazed at? The answer is very obvious. It is just because of the touch of "home" about them which no studio can ever supply that the owner is blind to their faults and defects.

The cottage or villa gate may not be handsome, but still it's a bit of the "home sweet home" for which hundreds of thousands of our men are yearning, and so (to them) more acceptable than the finest background ever painted. It's a real bit of home.

Now, what does this suggest to the mind of any thoughtful photographer? Does it not cry aloud the fact that if these defective snapshots are so treasured, a small book of proper photographic prints of the folk, the interior and the exterior of the home, would be regarded as a pearl above price? Yet why has it not been called aloud for by the public? Chiefly, I think, for two reasons. Firstly, that in order to make the finished work pleasing and satisfactory to their own critical eyes, and to look "worth the money" they cost, the albums supplied have been only fit for a library table, made specially to accommodate them; and secondly, because for these large books the charge has had to be quite prohibitive to people of ordinary means.

I am aware, of course, that the war will not always go on, and that there will not always be these "boys at the front" to send to, but still there are always a very large number of temporary exiles from home in one or another of the Overseas Dominions and other countries, who would give quite as warm a welcome to these albums as the men do, but somehow such things are seldom produced except in an amateur way. Yet, in every district in the country there must surely be enough people with friends and relatives abroad to justify the professional photographer in catering for and pushing this kind of work to his own considerable advantage.

My own idea is that such books should be of the art linen-paper variety, loose-leafed, so that if desired the contents can be taken apart and framed, and also because of the far greater convenience it would give to mount on single leaves in the ordinary way, afterwards assembling the leaves with the mounted prints into the covers in their proper order. Further, should any writing or lettering be necessary it would be much more easily done.

I should put the minimum number of views at six and the maximum number twelve, with quarter-plate as the usual size, but never making the views larger than half-plate.

In order to introduce such work to customers it would be necessary first to prepare two or three specimen "Books of the Home," as I should call them, of perhaps the exterior and interior of the studio, reception room, and workrooms, perhaps, also, dressing room, and the owner with his staff. This would be easily recognised by customers. Then either the photographer's own private house, or that of some friend's might be taken in the same way, taking care to include some favourite corner or fireplace with someone in a good easy chair reading, working, smoking, or in some other characteristic attitude. These "Books of the Home" would then be laid on the reception-room table, for the casual inspection of customers, with perhaps a neatly written or typed slip pasted beneath the first view to this effect: "You may send abroad the most expensive of gifts, but nothing can give such exquisite pleasure to the recipient as a book of views of home. Nothing is more prized."

Both photographer and receptionists would need to keep their eyes open, and when they see a customer at all interested in these books follow up the interest with a few (not many) timely words, suggesting that, though inexpensive, these "Books of the Home" make quite unique gifts for friends and relatives abroad. The seed thus sown will germinate in time, and as friends chat together over the idea, it will grow and take root, until the "Book of the Home" becomes a kind of institution, to the permanent benefit of the photographer.

In starting this scheme, however, the photographer should take some little care to explain it and its difficulties clearly to the receptionist, as she can do much to keep customers from asking for just those awkward "bits" of the home which would make the operating difficult.

I have set the usual size at quarter-plate for two reasons. First, a modern quarter-plate camera is far more easily carried, and the spoiling of a plate or two is not an expensive matter; and secondly, a mounted quarter-plate print, or album of prints can be carried in a man's coat pocket, whereas, if the prints were of, say, half-plate size, unless close-mounted, which would not be artistic or do the views justice, this could not be done conveniently.

When arranging for the supply of these "Books of the Home" with the customer, I should suggest that the photographer stipulate for the supply of at least three copies, as it is only by supplying more than one of them that he would be assured of a reasonable margin of profit.

I know many and various objections to this scheme will be raised by different photographers. Some will say that they have not time for much out-of-door work such as this, which would take some time; others, that they have not the apparatus; and some that they could not charge enough to make it pay.

Well, most photographers get quiet mornings at times, and surely one of these might be turned to such a use, and thus bring in a few extra pounds to swell the year's total. Then, again, with a little training such work would not be beyond the powers of the studio assistant, male or female; and that is one reason for the use of a light camera.

Then, as regards apparatus, my own preference would be strongly in favour of a camera of the Sanderson type, which is light, compact, and portable, and has moreover a wonderfully full range of movements which ought to meet all the demands made by such work, having long extension, wide-angle movement, and provision for the use of various components of the lens, or separate lenses, if desired. Also, the plate-holders are light and small, and a number can easily be taken. There are, of course, other cameras on the market probably equally good, but my own experience leads me to favour a Sanderson, which I may remark in passing, can often be purchased second-hand for a few pounds.

Two other stipulations should also be made by the photographer, or whoever takes the order: first, that he shall be at liberty to suit his own convenience and take the views at his own time—it will suit him better, and he will be able to make use of good weather conditions thus; and, next, that a definite numbered list of the subjects of the views shall be written out in the client's presence, for they have a neat little way of saying when one is at work otherwise, "Oh, you might just take a plate of this corner as well, in case we like it," which greatly adds to the time and plates used on the job. But if the list is already prepared the operator can safeguard himself by only taking just enough plates.

There would, of course, be one or more exterior views of the house—straightforward work usually—and then some interior views of the favourite rooms of the recipient of the book, or perhaps corners or views from windows.

Dark corners necessitate rather long exposures, which can sometimes be helped out by burning a length or two of magnesium ribbon, especially if a figure is included, but I do not advocate any attempt to try and use flash-powder. Sometimes, if there are several awkward interiors a second camera—say half-plate—

might be taken, and one exposure go on while the other view was being focussed, etc.

A preliminary visit to the scene of action might be useful to the operator, by enabling him to plan out how most easily and speedily to complete his work, and just what necessaries to take with him. Sometimes a few yards of gauze or butter-muslin to soften the light of an awkward window are most useful, and their value can be gauged at a first visit.

If figures are included (and they certainly do greatly add to the charm of the book) they should always be engaged in some homely occupation, and a party round a spread tea-table, for instance, will often come as a surprise to the operator when he sees the finished book, by the sense of reality and animation it conveys, though to him it seems tame or silly. And here let me give a word of warning. If the thing when complete is to be a success, it is not merely technical accuracy that will do it, but the book must convey the sense of its being a real live, used, inhabited home, and not model rooms arranged by a furnisher to display his wares. And to secure this it is the little touches that tell. A hat and coat on a chair, or a work-basket, will do a lot to liven things up, while many more details of this kind will suggest themselves to the operator's mind once he realises it.

Spring or summer would probably be the best time for such work, as then the foliaged gardens and flourishing window-boxes give an air of greater cheerfulness to the outside look of a house, and, to liven up the rooms, a fire can always be arranged for beforehand, as it looks far more cosy than an empty grate or fireplace filled with plants, etc., would do.

I think, unless unusually difficult, the whole set of six to twelve views should be easily managed during the course of a morning or afternoon. At any rate, as far as posible it should be arranged for one of those "slack" days we all get, when there are very few appointments booked up, and so nothing is lost, but something gained.

Black or sepia contact prints would, of course, be made, and there are several firms which produce admirable little loose-leaf albums—intended mainly for amateurs—which would serve the photographer's purpose most admirably. Any local printer could print or gold-block them with the works "Book of the Home" or any special name for a very small charge.

Each individual photographer's success with this work must, of course, rest on his own skill, tact, and business capacity in the way he handles it and the work. But we all know how one customer talks to another, and sends them along, and I am convinced, from long observation, that there is money, and good money, to be made by it with right handling.

Re-orders, of course, are sure to be received, and for this reason the negatives should be lettered A, B, etc., in the order in which they are inserted in the albums, and then the whole set should be stored together in one box, lest any get astray.

Supposing three books are supplied, it is then often possible to get an order for a dozen prints of one special view only, and perhaps an enlargement of the same also, by this means making the order quite a profitable one.

Some photographers will contend that they cannot charge enough for each book, but it seems to me that it is plainly a case of what you net on the entire order or orders rather than what you get for each book, and the size of the order depends very largely on the tact of the photographer and his receptionist. Even though you have to make an outlay for a special camera, only two or three decent orders will cover that, and you are still a most useful camera to the good; while if you hunt for them you will be sure to light on more orders, even in out-of-the-way corners. I have often been surprised at the amount quite a shabby man or woman will spend to give pleasure to some son or daughter across the sea, and every other photographer knows it also. So that work *can* be found. Anyway, I hope at least a few photographers will bestir themselves and leave the beaten track a little, and incidentally earn a little more.

G. E. Hartley.

THE OPTICAL MECHANISM OF HALATION.

[Although the optical causes of halation—scatter, reflection, and refraction of light in the glass of a dry-plate—are generally well understood, it is not often that one comes across a set of drawings which so excellently represent what we may call the optical mechanism of halation as do those contained in a quite elementary article written by Dr. C. E. K. Mees, and published in the "Australasian Photo-Review." The three photographs in connection with which the drawings have been made and the article written are by Mr. E. A. Rawson, of Newcastle, and the whole set (of photographs and diagrams) may be commended to teachers of photography as most clearly bringing into prominence the co-relation of comparatively simple optical phenomena and the production of remarkable halation effects. —Eds. "B.J."]

Halation is caused by light which passes completely through the emulsion, and also through the glass on which the emulsion is coated, and is then reflected back into the emulsion from the back of the glass. The simplest form of such reflection is shown by the diagram, fig. 2, where we see a ray of light falling on the emulsion at A. Most of this light is absorbed by the emulsion, but some of it passes through to the glass, and is reflected from the back of the glass, so that it reaches the emulsion again at B.

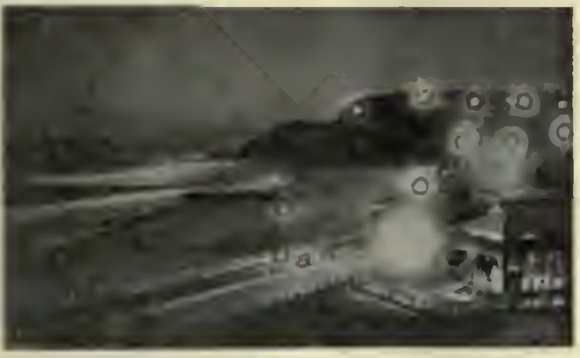

Fig. 1.

But this simple diagram does not account for the appearance of the lights in fig. 1, because if a ray of light had fallen on the plate squarely at right angles, and had passed through the emulsion at right angles, it would be reflected straight back, and the halation would not be spread beyond the image, whereas the halation is just as bad in the centre of the picture where the light fell squarely on the emulsion as at the edges. Also, it does not account for the ring which is shown around the lights.

As a matter of fact, light falling on a photographic plate does not go straight through in this simple way. When a narrow ray of light falls on the grains of silver bromide it is reflected from them and scattered about.

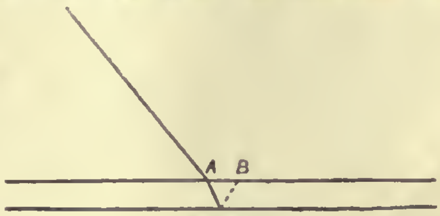

Fig. 2.

So we must imagine that if we could examine a magnified section through the plate, we should see the light falling on the emulsion scattered in all directions, so that a narrow beam of light is spread out into a kind of blur, the size of the blurring being very minute but still appreciable (fig. 4). This effect of light spreading in the film is called irradiation.

We see then that the light which passes through the emulsion of the photographic plate is travelling in all directions whatever may have been its direction before it reached the emulsion, and if we follow the light into the glass we shall find that most of the rays pass out of the glass again into the air, but that some of them are reflected back into the emulsion (fig. 5).

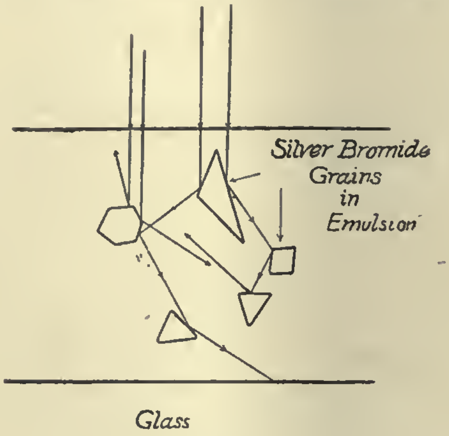

Fig. 3.

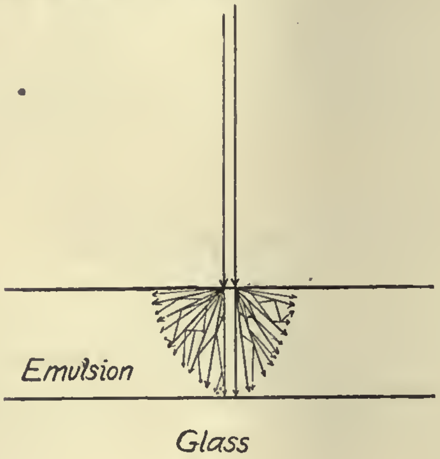

Fig. 4.

In order to understand this, we must look at the way in which different rays of light travel through glass. When a ray of light passes from air into a block of glass it is bent by the glass, which is a medium of different density, and when it leaves the glass again it is bent back so as to travel along a path parallel to that along which it entered the glass, but if a ray leaving the glass meets the surface at too big an angle it cannot go out, and it will be totally reflected back again. (See fig. 6.)

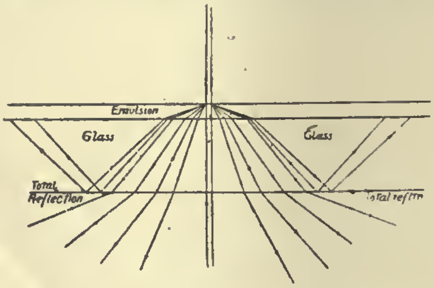

Fig. 5.

It is these totally reflected rays which produce the ring of halation. When the image of the lamp falls on the emulsion and enters it, the rays are spread out by irradiation, so that we get a small spot at the centre of the lamp; then this scattered light passes into the glass of the plate, and the rays which are near the centre pass out into the air from the glass and we get a dark ring, but when suddenly the angle of the rays to the surface of the glass get too big to get out they are reflected back, and produce a sharp ring of halation around the centre of the image, and then as they go further and further from the image the light gets weaker and the halation fades away again. (See fig. 7.) Thus we can account completely for the rings of light shown in the picture.

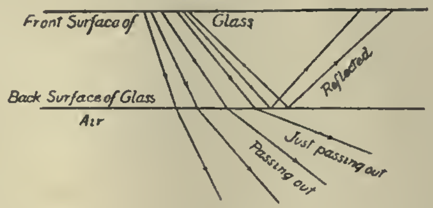

Fig. 6.

If we coat the back of the glass with some substance into which the rays would pass directly from the glass, and which would completely absorb them, we should wholly prevent the halation, and if we choose this "backing," so that it is of the right kind and almost completely absorbs the light, allowing very little of it to be reflected then it will be quite effective in reducing halation but in practice it is not altogether easy to get a satisfactory backing and to apply it correctly. Our Australian friend tried a "backed" plate but although he got rid of the sharp rings of halation (see fig. 8), his blotches of light reflected from the lights are still obscured by irregular reflection from the back of the glass.

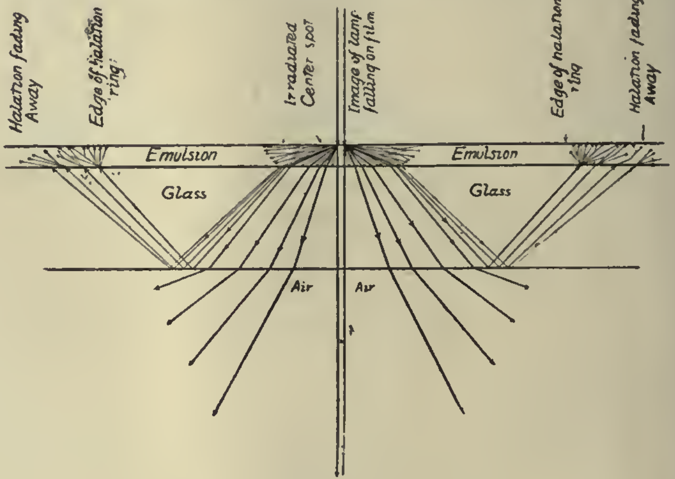

Fig. 7.

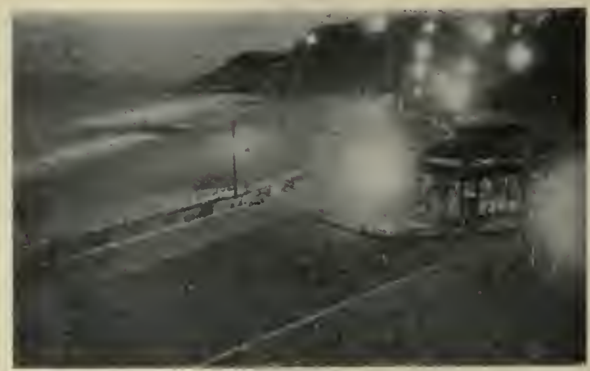

Fig. 8.

The best way of avoiding halation is not to have any glass at all. If we take the photograph on film, the support is so thin that the light has very little room to spread, and we get only a very small spreading of the light-rays. This spreading, in fact, is no greater than that necessary to give a correct representation of the effect of the light on the eye, since there really is a spreading of the light in the eye, and we do not actually see a bright light on a dark night as perfectly sharp, but as having a small amount of blur around it. So that in fig. 9, which was taken on Kodak film, we get a result which gives a very good idea of the scene as it appeared.

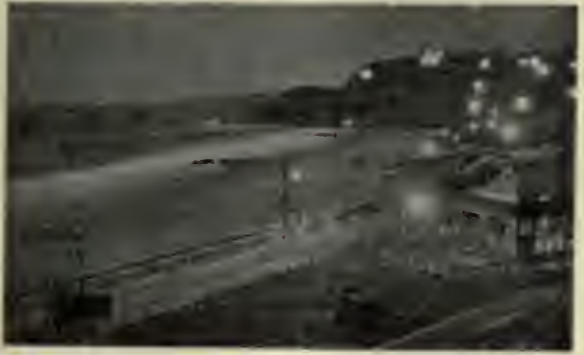

Fig. 9.

C. E. K. Mees.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Touching-Out Spots on White Mounts.

Users of white mounts, whether for photographic purposes or for mounting pictures, have been troubled with unsightly defects in the shape of black or coloured spots. This has been much more noticeable in mounts made under war conditions. These defects spoil the whole effect of what otherwise would be a clean white margin. Any attempt to remove them by scraping or cutting away with the retouching knife only makes matters worse, as the spots become much worse under such treatment. The following is a very reliable and easy way of getting rid of the difficulty. Procure a small tube of artists' Chinese white water-colour, squeeze a little out on a piece of glass, and work to about the consistency of cream, and then with the point of a clean spotting brush carefully spot the defect until it disappears. If this is done nicely there should be no trace of the spot. It sometimes happens that a defect in the paper of this kind will be found in a bromide print or enlargement; this should be spotted out with the white colour in the same way, and when perfectly dry if there is any difference in colour, the spot can easily be matched by the retouching pencil or brush.—E. H.

Personal Comfort when Carrying Heavy Apparatus

In these days of shortage of labour many operators have to carry their own instruments where previously a boy or youth was employed, and thus many photographers have doubtless learned that even a half-plate camera is by no means a light burden if the journey is one of any distance, and is made upon "shanks' mare." One of the greatest discomforts when carrying apparatus slung upon the shoulder is the cutting action of the sling strap. This, in nearly every instance when the commercial camera case issued by the makers of the instrument is employed, is far too narrow: hence its cutting or dragging effect upon the shoulder. I have recently fitted my half-plate camera case with a wide sling made of the two-inch webbing that can be bought at any saddler's for a few pence. This may be fixed to the strap just where it comes over the shoulder with split rivets, or the saddler will sew it on if this is a job that the photographer does not wish to undertake, and doubtless do it better. I have found that the greater width of the sling makes carrying the camera far more comfortable, and the weight of the instrument is less felt. When transporting a very heavy camera, however, the shoulder is certainly not the best support for it. I always carry it in the hand alternately, giving a change of arms when "aches" begin. The strap is buckled up fairly close in order to give a good grip. It will be found that the points noted above have a very material effect upon the personal comfort of the operator when carrying heavy apparatus.—Expert.

Profile Portraiture.

Judging from the results, which furnish abundant evidence, there are very few photographers who really understand the portraiture of the profile. Many of the prints in the average photographer's collection indicate that while this method of treatment is in every way suited to the sitter, in nine cases out of ten the result is little short of a failure, owing to the fact that skilful operating was not forthcoming. A certain softness of focus is desirable, particularly in the nearer planes of the picture, and in most cases an absolutely sharp outline is decidedly objectionable. With regard to the background, a plain one of a neutral tint is most essential; nothing of a scenic or cloud effect is productive of the best results. The chief points are, however, in the poise of the sitter's head and in the lighting, and the operator will find that these details well repay careful study and experiment, so that a certain effect may be deliberately obtained. Male models will rarely desire to be photographed in this way or be successful if they are; but with feminine sitters the head should be poised in as natural a manner as possible, and a slight inclination or lowering of the chin is to be preferred to a perfectly horizontal position of the head. This latter is a pose rarely successful, and suggestive in many cases of a stiff neck. One of the best profile portraits that the writer has ever seen was taken with a strong back lighting which gave excellent modelling of the neck and cheek. A good pose is what, for want of a better term, we may call a three-quarter profile, as this allows the cast of feature to be sharply defined without the "head cut right in half" appearance so often seen in this class of work. It is generally an advantage, if the sitting is prearranged, to suggest that the sitter should wear dark clothing, as in this case a fairly dark background may be employed, and the highest lights of the print are just where they ought to be—i.e., on the features of the model. One more word may be added on developing. Most of the profile work that the writer has seen has been spoilt through over-development, and the result is a print bordering on harshness. The operators have not realised that there is a distinct difference between a profile portrait and a silhouette. The effect to be aimed for is delicacy and softness of outline. The negative to be preferred is one that is only just enough developed for the shadow detail to print through, and every endeavour should be made to retain tone and modelling; for this a full exposure and dilute development are ideal.—Manto Vano.

New Books.

Photograms of the Year, 1917-18. Edited by F. J. Mortimer. London: Hazell, Watson, and Viney, Ltd. 3s. and. 4s. net.

It would have been a matter for positive regret if the circumstances of the time had interrupted the annual issue of "Photograms." While the thoughts of everybody are very rightly directed on the war, it is well that there should be a reminder of aims and motives which are the antitheses of the war-spirit, and fortunately cannot be destroyed by it. Hence, it would have been a mistake, which Mr. Mortimer has been wise enough not to make, to have forced the volume into the rôle of pictorial recorder of scenes of the conflict on land and sea. Of this there is just a taste enough to give one all the more relish for themes which in the past have made an irresistible appeal, and shall again.

The reproductions of the examples of pictorial photography—all from exhibitions, we are told—number a hundred, and are the subject of running notes in a calmly appreciative vein by W. R. Bland, who writes with a fine sense of what is artistically good, and, thank Heaven, has the courage to dispense with the technical jargon of the art-critic. The reason, no doubt is, that Mr. Bland simply tries to say in so many plain words what are the qualities in these photographs which give them an artistic merit in his eyes: which is precisely what students of pictorial aim in photography will wish to know.

Other literary contents, beyond the Editor's review of the year, are some thoughts on pictorial photography after the war by Anthony Guest, and an article, "Photography's Part in the War," in which Mr. Ward Muir might, we think, have gone more into detail without needing to fear the ban of the censor.

A final word deserves to be said for the quality of photo-engraving and printing. In these respects, "Photograms" maintains its high pre-war standard.

Photographic Words and Phrases.—The latest issue, No. 169, of the "Photo-Miniature" carries out an idea for which, no doubt, many beginners in photography will render it humble and heartfelt thanks. It devotes forty-eight pages to an alphabetical list of the technical words and phrases commonly used in present-day photography, and gives in a few simple words the meaning of each. Many a beginner must feel confused when he is told, for example, to use a lens "at open aperture," or when somebody talks to him about the advantage of a "separable" lens. Whilst sacrificing very little in the way of accuracy, it is possible to tell the student of photography in a dozen words or so what are the precise meanings of the four or five hundred technical terms brought together in this issue of our New York contemporary, which incidentally, through its address to America readers, reveals some of the differences of technical expression which still exist between this country and the United States. The "Photo-Miniature" is not now obtainable in this country, but may be had from the publishers, Messrs. Tennant and Ward, 103, Park Avenue, New York, by remittance of twelve penny stamps or international coupons equivalent in value.

New Materials, &c.

Serchol Developer. Sold by W. Butcher and Sons, Ltd., Camera House, Farringdon Avenue, London, E.C.4.

It is satisfactory to find that in adopting the policy of forswearing the use of goods of German manufacture, photographers will have a fair amount of choice in replacing the universally employed metol by developers of all-British composition. The latest developer which comes in this category, and of which we have had an opportunity of making trial, is that to which Messrs. Butcher have given the name of "Serchol," not a bad name, by the way, for a developer. Serchol is offered as a complete substitute for metol for use alone as a developer or in combination with pyro or hydroquinone; for use, moreover, as a tank developer and for the development of cinematograph film. A trial of it shows that, made up according to the customary formula (sulphite and carbonate with a little bromide), it yields alone negatives of beautiful brilliance and detail, and is equally satisfactory as a developer of bromide and gaslight prints. Compounded with hydroquinone, it yields a universal developer, suitable not only for negatives on plates and film, but serving equally well for bromide and gaslight papers. Probably the use of a developer of the metol type is greater in this form than in any other way, and, from our own experience of Serchol, we can say that the user, whether professional or amateur, will find no cause for complaint in the quality of his results when employing the Serchol-hydroquinone formula given on page 6 of the little booklet which Messrs. Butcher have issued. The developer is a quick one for prints, yielding an image of fine black colour, of remarkable pureness in the high-lights and of rich blacks in the shadows. There are no special precautions to be taken in using Serchol, except that in compounding stock solutions it should not be used in a greater concentration than 1½ grains per ounce, a maximum strength which is still sufficient for permitting the making up of a stock solution which can be considerably diluted for use. Photographers should certainly make themselves acquainted with this new product, which is supplied in ¼ oz. packets at 1s., in ounce tins at 3s. 9d., and in larger quantities.

Glycin-Johnsons.—Messrs. Johnsons, Manufacturing Chemists Ltd., who just about a year ago began the manufacture in this country of metol, identical with the developer previously made in Germany, have now just placed upon the market the developer Glycin, which also they make in their own factory. Of all the organic developers which were originated by the German chemists in or about the 'nineties, Glycin is perhaps the most distinctive of any. The slowness of its action has prevented it from ever becoming popular as a developer for general use, but, on the other hand, its remarkable freedom from fog and its non-liability to oxidise when in weak solution have specially qualified it on the one account for the photography employed in photo-engraving, and on the other for stand development with a dilute solution. Probably the requirements of process engravers represent 90 per cent. of the demand for Glycin, a demand which is thus comparatively small but undoubtedly insistent. It is therefore a matter for congratulation that Messrs. Johnsons should have brought the manufacture of Glycin to a point of perfection, and are able to offer photographers a product which, as our experience of the developer shows, is identical with that previously made in Germany. Glycin-Johnsons, as the British-made developer is styled, is supplied in 1 oz. bottles, and may now be obtained on application to Messrs. Johnsons, 23, Cross Street, Finsbury, E.C.3.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, May 25.

South London Photographic Society. Excursion to Lincoln's Inn.

Wednesday, May 29.

Croydon Camera Club. A Display of Prints by Members and Criticism Thereof.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held on Friday, May 10. Present:—Messrs. A. Ellis, R. N. Speaight, Gordon Chace, F. W. Wakefield, T. Chidley (Chester), Marcus Adams (Reading), W. B. Chaplin (Windsor), R. Haines, Frank Brown (Leicester), Lang Sims, S. H. Fry, A. Mackie, G. Hana, W. E. Gray, A. Corbett, and C. F. Dickinson. The Council further discussed the resolution passed at the annual general meeting:—"That the Council be requested to consider the practicability of training and employing disabled soldiers and sailors as photographic workers, and to make a report," and it was agreed that a draft report be printed, and a copy sent to each member of the Council. Mr. Lang Sims reported in reference to the Business Men's Association that a Select Committee of the House of Commons had been appointed, and the minutes of that committee were now in the hands of Sir John Bethell, who will put the case before the proper members of the Ministry, and their views will then be obtained. Consideration was then given to matters concerning the suspension of members on active service. A report was made as to arrangements made with the Eagle, Star, and British Dominion Insurance Company to effect insurances for members at reduced terms, and the hon. secretary was authorised to take up the agency on behalf of the Association. The institution of a Roll of Honour of members who have been employed in the service of the nation in connection with the war was decided, and a committee appointed. It was reported that an article commenting upon the scheme of the National Portrait Gallery had appeared in "John Bull." The names of fourteen members who had joined during the month were read, and various cases of advice and assistance given to members were referred to.

CROYDON CAMERA CLUB.

Mr. Bertram C. Wickison, F.R.P.S., gave a capital demonstration on "Combination landscape printing," one of those excellent topics which afford a club reporter a restive night out untroubled by brain pressure, owing to the subject being essentially one which requires actual demonstration to be readily followed and understood. How reminiscent it was of good old times, and the stalwart and militant H. P. Robinson and other combination printers, who roused the purists to righteous wrath by what they deemed to be a prostitution of photography. Possibly part of the noble indignation expressed originated from the fact that the tricky manipulation was beyond the capacity of the conscientious objectors of the period, and, speaking from recollection, the clever combiners brutally alleged this to be the case. Then there was the well-remembered ambuscade which entrapped a hard-hitting opponent and accomplished scientific wrath. Being unaware that an exhibition print for once, and of set evil purpose, had been executed absolutely "on the straight," joins were detected, and pointed out as being painfully and pathetically obvious. Like a hawk on its prey, Robinson swooped, and the too-wise bird experienced a trying time, only escaping by the skin of its beak with plumage badly ruffled.

However, Robinson was once caught on the hop at the Camera Club. During a discussion a member gravely congratulated him on the astronomical value his prints possessed. "Astronomical value! I don't follow you in the least," said the great R. tartly. "You surprise me," continued the unabashed member, "for your unerring photographs prove beyond doubt that the sun must have occupied several distinct positions in the sky at one and the same time, a fact of great scientific importance, as nothing of the kind has ever been suspected at Greenwich." This woke up the artist, who said what he thought about the member and his views in clear and unmistakable terms, for the men of the camera were men in those days, and expressed opinions regarding one another in elemental and vigorous fashion. Now-a-days the cult seems to have degenerated into observing common-place courtesies of debate, and half the fun of the fair has vanished, perhaps never to return.

Whatever opinions may now be held regarding the ethics of combination printing, as the President pointed out, it is strictly a photographic process, and one demanding high technical skill and judgment.

Many straight prints from negatives subsequently combined to form really attractive pictures were shown by Mr. Wickison, and in order to emphasise the difference loving care had hardly been taken in the production to the former. By a system of rough registration as a guide to vignetting in and out, and covering portions of the negative with black paper, he secures with apparent ease the most wonderful transformations, and a triple combination bromide print made by contact to an unfamiliar illuminant, and under strange conditions, was nothing less than a marvel. One admired his pluck in attempting the job so heavily handicapped. When making negatives for combination printing, he said, care should be taken to avoid sunlight, or the shadows might give the game away. A most hearty vote of thanks was accorded the demonstrator.

Commercial & Legal Intelligence.

Goods on Approval.—Judge Cluer gave a decision of considerable importance to the trade in the Shoreditch County Court last week in an action in which Clement Stone, trading as Messrs. C. Stone and Co., of 17 and 19, Bridge Street, Cardiff, photographers, sued Mary Blanche Olley, trading as M. B. Olley, of 110, Southgate Road, N., photographer, to recover £16, being £15 money paid for certain photographic apparatus on approval which was returned and £1, which was paid to the defendant to see that it was properly packed and sent by passenger train, which was not done. There was a letter to the court from Mr. R. C. Olley, as 2nd Air Mechanic, Photographic Section, R.F.C., Yatesbury, in which he claimed that it was entirely his transaction, and that his wife acted under his direction. He also said that the goods were not sold on approval, and were as represented. He asked for the case to be adjourned for a fortnight to enable him to get leave and attend.

Mr. Rowland Thomas appeared as counsel for the plaintiffs and Mr. T. W. Moore represented Mrs. Olley. Counsel, in opening, said he thought he could prove that the lady was liable. So far as their information went, the business was made over to her in 1912. This transaction had to do with a "stickyback" outfit. The plaintiffs advertised for one in the trade organ, "The British Journal of Photography," and got a reply from Mr. Olley—the only letter writen by him—offering the outfit, "All in new condition." A representative of the plaintiffs called, and saw only Mrs. Olley, who was in charge. Subsequently, the sale was effected for £15, and the plaintiffs, badly wanting it for the Christmas trade, sent £1 to expedite its delivery by passenger train. This was never done, and, as a fact, it was not sent off till the middle of January. It was badly packed, and the shutter and door were missing.

Isaac Steeling was called, and said he used to be in partnership in the plaintiff firm. The "Stickyback" outfit was supposed to be a 60 on a 12 in. x 10 in. plate, new, which cost £30. When it arrived it was found to be made of common deal, and was old, so was returned at once.—In cross-examination, the advertisement in "The British Journal of Photography" was in the name of "Mr. Cummings," who was his sister, advertising for him.

Mr. Moore: You know this trade journal very well? Witness: Yes. Mr. Moore: It is a rather influential journal in the trade? Witness: I take it it is. Mr. Moore: And what appears in it can be relied upon? Witness: I had to do with an advertisement, that was all. Mr. Moore: Do you know that Mr. Olley has constantly advertised in this trade journal as C. R. Olley, trading as M. B. Olley? Witness: I don't know. I did not pay sufficient attention to his advertisements. Mr. Moore: If it is so you would say that clearly there was no attempt to deceive the public as to who he was, and how he was trading? Witness: I suppose that would be so, but I had nothing to do with him. I only saw Mrs. Olley, and it appeared to be her business so far as I could see. Witness added that he never saw the goods when he called as they were at Southend-on-Sea. So far as he could judge, the pedestal was twenty years old. This closed the plaintiff's case. For the defence Mrs. Olley gave evidence, and said that there was a certain amount of her relatives' money in the business, and they insisted as a kind of safeguard that her initials for the firm should be used. Otherwise than that she did not hold herself out as running the firm, but of course she was having to carry on as best she could in the absence of her husband. She had nothing whatever to do with the sale of this outfit, but her husband wrote and told her to send it on, so she sent her son to Southend, who packed and despatched it. At that time, at Christmas, the railway company would not accept goods for delivery by passenger train, so it had to be sent the other way, there was no help for it. Judge Cluer said the whole case in a nutshell was that this was sent on approval. Mr. Moore: My submission is that the goods were fully up to what they were represented to be, and that a firm is not entitled to put a person to the trouble of sending the things on and then for a mere whim to return them. Judge Cluer said there could be nothing in the argument when it was taken into consideration that the whole transaction clearly appeared to be one of approval. Having arrived on approval, and not being approved, they were quite legitimately returned. There would have to be a verdict for the plaintiff for £15 paid for the outfit, but as to the £1 they would have to bring a separate action in a different form if they felt disposed to do so. Judgment was then entered for the plaintiffs for £15, and costs, and his Honour ordered the payment of the costs of the witness from Cardiff. Mr. Moore asked if an order could be made for the payment of the amount by instalments, but Judge Cluer, with considerable emphasis, retorted: "No, payment at once; your client has had the money."

Canvassers' Reception.—At the Boston Police Court last week Mary Ann Stanton, a married woman, of Granville Road, Boston, was summoned by Edith Shillito, of Tower Street, Boston, and Elsie Cook, of Liquor Pond Street, Boston, photographers' canvassers, for assault on May 8.—Complainants said that on Wednesday they visited defendant's house, soliciting orders for enlarged photographs. Defendant said she did not require one, and insinuated that they were frauds. Some words ensued and, Shillito said, defendant threatened to slap her face, and ultimately threw a bucket of dirty water over them.—Defendant admitted throwing the water, but said she did so under great provocation. She repeatedly told the girls to leave her premises, but they were impudent, and would not do so. She was washing her floor, and she told them that if they did not go away she would throw the water over them, and as they still continued she did so.—The magistrates dismissed the charges, believing that the defendant received great provocation.

NEW COMPANIES.

British Photographic Research Association.—This organisation (the word "limited" is omitted from the title by licence of the Board of Trade) was registered on May 15 as a company limited by guarantee with objects as indicated by the title. Original number of members 100, each liable for £5 in the event of winding up. The first Council consists of Dr. J. J. Acworth (Imperial Dry Plate Co., Ltd.), G. M. Bishop (Marion and Co., Ltd.), W. F. Butcher (W. Butcher and Sons, Ltd.), A. W. M. Dickins (Johnson and Sons, Manufacturing Chemists, Ltd.), A. Edwards (Austin Edwards, Ltd.), H. J. Elliott (Elliott and Sons, Ltd.), E. W. Houghton (Houghton's, Ltd.), T. Illingworth (Thos. Illingworth and Co., Ltd.), F. F. Renwick (Ilford, Ltd.), C. F. S. Rothwell (Rajar, Ltd.), G. S. Whitefield (Paget Prize Plate Co., Ltd). Registered office: Sicilian House, Southampton Row, W.C.

News and Notes.

The Amateur Photographer.—Messrs. Iliffe announce that they have acquired the "Amateur Photographer" from Messrs. Hazell, Watson and Viney, together with all the firm's other photographic publications. The "Amateur Photographer" is to be combined with "Photography and Focus" under the continued editorship of Mr. R. Child Bayley.

Some confusion is likely to be caused among buyers of photographic text-books by the fact that a new manual, written by Professor John R. Roebuck, of Wisconsin University, bears the title "The Science and Practice of Photography." Surely it was possible to find a name not identical with that of the text-book by Mr. Chapman Jones, even if (which is very doubtful) a better manual of its kind was to bear it.

The Late G. D. Scorah.—Photographic optical and photographic circles in Leeds have to lament the death of Mr. George Dixon Scorah, who for many years had been associated with these branches of business in the town. Mr. Scorah was educated for the scholastic profession, but early in life joined the firm of Harvey and Reynolde, Commercial Street, Leeds, with whom he established an optical photographic and scientific instrument department. Later in life he carried on a similar business in Bradford. At the time of his death he was in his eightieth year.

Correction.—In consequence of it having been impossible to submit proofs to the author of the article by Mr. M. B. Bitter in our issue of April 12 last, p. 170, several distortions of the original manuscript were unfortunately passed into the article in printing. In paragraph 4, col. 1. p. 170 "abominable" in two places should have been "abnormal." In the last line but one col. 2, p. 170, "most lighted" should have been "worst lighted," an unfortunate reversal of meaning. In the last whole paragraph col. 2, p. 171 "necessarily long exposures" should have read "unnecessarily long exposures." In paragraph 3, p. 172 "mutually" should be "mentally," and in line 26 "stops" should be "steps."

The Affiliation Outing.—The summer outing of the Affiliated Societies is this year being organised by the Hammersmith Hampshire H.P.S. It is to take place on June 15, and will consist of a riverside ramble from Richmond to Kew, including Isleworth and Strand-on-the-Green. Alderman Hilditch, of Richmond, is kindly throwing open his garden to members. Four plaques and certificates are offered for competition by the inviting society, and a plaque is also offered by the United Stereoscopic Society for the best stereoscopic print taken on the occasion. Intending competitors must sign the book at Messrs. Pitts not later than 6.30 p.m. on the day of the outing.

Tea has been arranged for at Messrs. Pitts, Kew Green, and the tickets, price 1s. 6d., must be applied for before June 13 to the Outing Secretary, Hampshire House, Hog Lane, Hammersmith, W. The tide will be low, and it is hoped that an enjoyable afternoon will be spent.

Lecture Demonstrations on Printing Processes.—Readers in or near Manchester will have the opportunity of attending a course of lectures at the Manchester Municipal College of Technology on modern printing processes, in particular, bromide, oil, bromoil and carbon. The series begins on Monday next, May 27, at 7.15, and the lecturer is Mr. F. G. Curson, president of the Manchester Amateur Photographic Society, and head of the photographic department of the "Daily Sketch." Mr. Curson is himself a very successful worker in pictorial photography, and his appearance as an instructor therefore provides an opportunity of which photographic students in the Manchester district will be glad to avail themselves. The fee for the course is 5s.

The Workroom.—We have to acknowledge the receipt from the office of the "Photographic Journal of America" of a volume (titled as above) of over 160 closely-printed pages, consisting of articles and paragraphs on practical topics which have been published in our contemporary. Many of these will be found old friends by readers of the British photographic Press from which they have been transplanted into American journals. But let us do the editor of this miscellany the justice of specially emphasising the fact that acknowledgment to the British source is consistently made. The volume contains an immense amount of miscellaneous practical instruction, and the worst thing that can be said about it is that its contents deserve a better index than the one provided for them. The index offends the primæval principle of indexing by chopping up its entries into seven separate alphabetical lists.

Concrete Developing Tanks.—Few photographers, writes a correspondent, have, as yet, heard anything about concrete tanks for quantity development, and yet they exist, and are very serviceable. in Rochester, U.S.A., the home of the Eastman Company. A United States expert on concrete, a Mr. C. M. Chapman, has given such tanks a considerable amount of attention, and he tells us that they may be constructed in the same way as tanks of similar size for water. They may be thin in section, reinforced with wire mesh or expanded metal, made smooth on the inside and outside with mortar, and kept moist until thoroughly hardened. They should then be coated both inside and outside with two or more coats of a bituminous base, water and acid proof paint. Concrete without such a coating will not withstand the action of the acids, alkalies, etc., used in photographic solutions. But with a coating as above indicated concrete tanks or trays will give complete satisfaction in the photographic laboratory. The Eastman Company report the satisfactory use of concrete tanks, which are made of a rich mortar containing waterproofing on a half-inch galvanised wire mesh, finished smooth inside, lined with waterproof paper, and finally coated with asphalte paint.

Australian Battle Pictures in Natural Colours.—Battle pictures by the official artists and photographers with the Australian Forces in France and Palestine will be shown at the Grafton Galleries, New Bond Street, from May 25 to June 22. An interesting feature of the exhibition is that natural colour photographs, as distinct from prints which have been "sprayed," will be shown for the first time.

A series of splendid pictures taken during General Allenby's advance in Palestine has been made by Captain Hurley, who is already famous as the photographer with the Mawson Antarctic Expedition (1911-1914), and the Shackleton Antarctic Expedition (1914-1917). The Western front photographs are by Captain Hurley and Lieutenant Wilkins (who was a member of the Stefansson Arctic Expedition).

Lovers of art will find much to interest them in the paintings depicting various phases of modern warfare which have been made by such well-known Australian artists as Lieutenant H. S Power (who has three pictures in this year's Academy), Lieutenants F. Leist, Quinn, Bryant, and G. W. Lambert. Australian naval pictures will also be displayed

The exhibition is being held by the Australian Government in conjunction with the authorities of the Australian Imperial Force, and will form the nucleus of a national Australian collection of war pictures. It will be open from 10 a.m. to 6 p.m. on week days, and from 3 p.m. to 6 p.m. on Sundays. The Australian Military Band will play daily.

Edinburgh Photographers.—A meeting of the professional photographers of Edinburgh was held at Messrs. Drummond Young and Watson's Studio, 82, George Street, Edinburgh, on May 1, 1918. Present were:—Mr. Young (in the chair), Mr. Ferguson, Mr. Barrie, Mr. Moffat, Mr. Lander, Mr. Swan Watson, Mr. Bambrick, Mrs. Parken, Miss Bertram, Mr. Balmain, Miss Anderson, Mr. Yerbury, Mr. Ayton, Mr. Macalpine, Mr. Rushbrook, Mr. Campbell Harper, and Mr. Johnston.

As had already been explained in the circular, the meeting had been called to consider the question of photographers of Edinburgh closing their studios for the period of from a week to a fortnight for the purpose of summer holidays. This matter was discussed by the meeting, all of which was unanimous as to the advisability of adopting such a scheme, the only point of variance being the exact length of time for which to close. On this matter a vote was taken, the decision being in favour of ten days. It was further decided that the ten days should be from August 21 to September 2. A combined advertisement in the "Scotsman" would be inserted for about six consecutive Saturdays prior to August 21, and those who desired to close for a longer period could advise the public of this in the advertisement.

The manageress of Messrs. Louis Saul Langfier, Mr. Morrison, of Leith Street, and Mr. Coltart had communicated their approval to the meeting, and Miss Roberts and Mr. Ross had also signified their agreement with the scheme. To these, as well as to all those who had neither attended the meeting nor expressed their views, it was decided to communicate the decision of the meeting, and to invite them to join with the remainder.

The chairman then intimated to the meeting that a proposal had been put forward to form a professional photographers' society in Edinburgh, the name of which would be "The Edinburgh Society of Professional Photographers," and he invited the members of the meeting to join. This proposal met with unanimous approval, nearly all those present expressing their willingness to become members of the new society. Mr. Edward Drummond Young was elected chairman, and Mr Moffat secretary and treasurer. A small committee was then appointed, consisting of five members, namely, Mr. Ayton, Mr. Yerbury, Mr. Bambrick, the president, and secretary. The committee was instructed to arrange the amount of the annual subscription, and to draw up a few simple rules for the society. It was arranged that the committee should be responsible for the calling and arranging of meetings, and that a second meeting should shortly be called in order to report progress. The meeting then closed with a vote of thanks to Mr. Young for the use of his rooms.

Correspondence.

⁂ Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.

⁂ We do not undertake responsibility for the opinions expressed by our correspondents.

FREE-SITTING PROFITEERING.

To the Editors.

Gentlemen,—I should like to refer to the letter of "Cousin Jack" in your issue of the 10th inst. Your remark in the "Summary" of that issue, "a most objectionable abuse," etc., refers, I take it, to the charge for "*one* cabinet print 12s. 6d." I should like to know where the abuse comes in?

With present prices of materials, labour, etc, I think the amount asked is fair, and that from a small man in the provinces, who thinks his work worthy of reasonable recompense.—Yours faithfully, JNO. JACKSON.

Aberdare, Glam.

[Allowing for the greater cost of materials, etc., we think the price stiff; the abuse lies in the exploitation of a monopoly.—Eds. "B.J."]

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

C. E. S.—There is no better instrument than the first one on your list. The other two come in a somewhat inferior category.

J. B. Sullivan.—The firm has been dead for a good many years, and its specialties, so far as we know, are not now manufactured.

Alfred Waddell.—Try Brunton and Williams, 148/150, Peckham Rye, S.E.; Hammond and Grant, 61, Wilson Street, E.C.; or Tate and Co., 1, Clerkenwell Green, E.C.

S. J. F.—We certainly think so, but there is no general rule. If it came to a summons, judgment would depend on the evidence, and we think that yours would be quite conclusive.

J. McKendrick.—You are under a misapprehension. The Order means exactly what it says—viz., that you must not use any kind of artificial light in a shop front. See the paragraph under Ex Cathedra on another page.

W. T. D.—Our opinion is that it is a process not worth troubling about, one of those methods which succeeds at one time and at another fails for no ascertainable reason. You had far better follow the customary plan of making a positive transparency and a second negative from it.

F. D. Kent.—We know nothing about the firm; none of its advertisements have appeared in the "B.J." You had better take the matter up with the advice of a solicitor. It would hardly do to assume that the whole thing is a fraud, and if you said in a letter that it was you might find yourself actionable for libel.

K. L.—The posing, lighting, and quality of the portraits is exceedingly good. As regards the retouching, so far as we can judge from untoned prints, which do not give one much of an idea, your work is rather coarse. Perhaps it would look all right in finished matt prints. Our advice is that if you think you need any further instruction, it is in retouching and not in lighting. Very likely you would benefit by some postal retouching lessons from Mr. T. S. Bruce, 4, Villas-on-Heath, Vale, Hampstead, N.W.3, who is a very experienced teacher.

K. K. S.—Impossible for us to forecast what will be the models in most demand after the war, but if you have a novel and good design, and can show it in drawings and in the actual instrument to one or other of the manufacturing firms, we are quite sure that they will be glad to consider it. You do not tell us enough about it for us to say if it has been patented in the past, but you could ascertain this for yourself with not a very great deal of trouble by going through the classified abstracts of patent specifications in the Patent Office Library.

A. K.—If the drawing is on thick paper, printing will be a very slow job. It is the usual custom to make a tracing and reproduce duplicates from it, but if you can get plenty of sunlight it is quite practical to make a copy in white lines on a blue ground on the so-called ferro-prussiate or blue-print paper, which is finished simply by washing in water. If you want a copy on a white ground, you must use either the so-called ferro-gallic paper (also developed in water), or else you require to make a negative on sepia paper, and from this print a positive on the same material. This will give you a copy in dark brown lines on a white ground.

Studio.—I have fitted up a studio 24 ft. long, 11 ft. wide, 12 ft. high, 4,000 c.p. lamps, two on one side with one sheet of calico in front, one 2,000 c.p. lamp in centre with calico in front, one 2,000 c.p. lamp on other side with calico in front; height of lamps from floor about 6½ feet, lens 8 in. about f/5, exposure about 4 seconds with a small stop. Would you kindly let me know if I am about right, and let me know what would be the best lens to use?—H.

Your arrangement seems all right, although the lamps are rather low for standing figures. Eight inches is rather a short focus for your length of studio for cabinets; ten would be better. A good portraits lens, say, Dallmeyer 1A or a 4.5 anastigmat would be very suitable.

Removing Varnish.—For a special purpose the varnish coating from a number of old negatives requires to be removed in order to allow of intensification in some cases and reduction in others. What is the safest method of clearing off the varnish? I recollect having seen a formula somewhere in the "B.J.," but have been unable to turn it up.—G. E. Whitehouse.

If the negatives have been varnished, as is most probably the case, with a shellac varnish it is easy to remove the coating by soaking the negative for a *short* time in 10 per cent. liquor ammonia, that is, 1 oz. of .880 ammonia in water to make 10 ozs. water. It will be seen that the varnish is speedily removed on rocking the dish. As soon as it is, the negative should be placed for a short time in a second bath of the ammonia and then washed under the tap. Avoid leaving negatives for any length of time in the ammonia solution, since the gelatine film is liable to be attacked by it.

Hardening Drying Net.—What is the material for toughening surface of the net used on frame for drying prints? I have found no need to treat a set of nets during the winter, but within the last day or two, owing, I suppose, to the hot weather, have found that prints in some cases have stuck during drying. Would hardening the net avoid this, or is it the fault of insufficient hardening of the prints?—W. A. S.

It may be both, for unless you are using a very hardened emulsion you are pretty certain to have prints stick at the present temperature unless treated in a fixing-hardening bath or separately hardened. However, the mixture for the toughening of the net is:—(A) Alum, 3 lbs.; soft water, 160 ozs. (B) Lead acetate, 1 lb.; soft water, 80 ozs. A and B are thoroughly mixed and the heavy white deposit allowed to settle. The clear liquor is poured off and the netting allowed to soak in it for 20 minutes, after which it is lightly wrung out and put aside in the shade to dry.

Fine Focussing Screen.—I write to ask you if you can inform me what is the method used for making the extra-fine ground-glass screens which are sold. I have one which is three or four times as fine as another screen, the latter one supplied with the camera when it was bought. Many focussing screens, I find, are much too coarse for the best focussing, and it is a pity that camera makers do not make it a rule to fit the finest grade of screen.—J. G. Raleigh.

We do not know what method is used, but we imagine that it cannot be anything than using the finest grade of carborundum or emery powder. If you must have a very fine screen without the labour of grinding it is easy to make one by taking any extra-rapid plate and, in the dark-room, immersing it, without any exposure at all, in any non-staining developer free from bromide. At the end of five minutes it is removed, fixed, and washed in the usual way. It is then placed for a few minutes in a solution of iodine in potassium iodide, rinsed and bleached in dilute ammonia. After a brief wash and on drying it will be found to have a fairly dense but very fine grain over it, and can be used for all the purposes requiring an ultra-fine ground glass.

Uranium Reverser.—We shall be very much obliged if you can tell us anything of the so-called uranium reversing process. We have been unable to find anything about it in any of the books we have looked at. Apparently it is some preparation which reverses a negative somewhat after the manner of the permanganate bath in the Autochrome process. Possibly it is a commercial preparation, in which case we should be glad to know who supply it.—Charles Cook and Co

There is no well-known process which passes by this name. We can only suppose that you refer to a method of making enlarged negatives direct from a small negative devised some years ago by Mr. W. L. G. Bennett, of the Croydon Camera Club. An exposure is made on bromide paper in the ordinary way and the positive enlargement developed as usual. Then, instead of fixing, it is washed for a minute or two, and toned in a uranium toning bath, after which it is passed through a weak solution of ammonium sulphocyanide (to clear away uranium stain), again washed, and then exposed to the light of magnesium ribbon. On then re-developing in an alkaline developer, a negative image, printed on the residual emulsion through the non-actinic uranium positive, is obtained, and at the same time the alkaline developer destroys all traces of the uranium positive.

Stained Negatives.—As a result of using some old stock solutions of developer we have recently had several bad cases of developer stain and unfortunately on subjects which it is impossible to retake. While we have managed to take off prints by absurdly long exposures on bromide paper, it is almost impossible to get anything presentable from the negatives in the way of enlargement even with absurdly long exposures with an arc light. We have tried the ordinary stain removers such as acid-chrome alum and a mixture of sulphate of iron and citric acid on one of the negatives, but with scarcely any effect. We should be glad for your advice is dealing with the others, having regard to the fact that the negatives are irreplaceable.—C. S. N.

The best thing you can do is to treat the negatives according to the formula worked out a year or two ago by the Ilford Company. The negative should be allowed to soak for about 10 minutes in a bleacher made up as follows:—Potass permanganate, 50 grains; common salt, ¼ oz.; acetic acid, glacial, 1 oz.; water to make 20 ozs. After a brief wash it is transferred to a solution of 1 oz. potass metabisulphite in 20 ozs. of water and left there until white to the back of the film. On then re-developing in any non-staining developer it will be found that the image is clean and free from stain and that in other respects the quality of the negative is unaffected.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less	1/-
Extra words	1d. per word.

(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

"Box No." and office address ... ... charged as 6 words.
For forwarding replies add ... 6d. per insertion for each adv't.
If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

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SUMMARY.

We print this week the questions set in Grades I. and II. of the recent examination in photography conducted by the City and Guilds of London Institute. The answers to the questions will, we hope, afford some reasonable idea to intending students of the form which answers should take. (P. 249.) In a leading article we have something to say on the value which a written examination paper has, at any rate for those engaged in photography, as a test of knowledge and an inducement to study (P. 246.)

Some notes on the equipment which may be said to represent the essential minimum in equipping a studio for everyday professional portraiture will be found on page 247.

It may be hoped that photographers will be encouraged to take up the idea of a communal system of closing studios for an annual holiday, such as has been undertaken by their confrères in Edinburgh, Dorking, Northampton and, we believe, other places. (P. 245.)

The scrupulous care of originals sent to a studio for the purpose of copying is a point on which there cannot be too precise instruction. A system of providing safe storage for every such original will avoid the very great annoyance which an accident to a customer's property is bound to cause. (P. 245.)

In a contributed note Mr. A. Lockett points out that the diffusing action of a negative or positive transparency requires to be taken into consideration in the adjustment of an optical system for enlarging or projection (P 248.)

A contribution to "Assistants' Notes" describes an appliance for the charging of accumulators or a printing mercury-vapour lamp circuit. (P. 252.)

A third edition of the "Portrait Studio" is just published. This little manual has proved, as we have frequently learnt, of very great service to those seeking fresh premises or considering alterations to existing studios. (P. 246.)

One or two of the elementary precautions which make the difference between obtaining a developing solution in the best and in an inferior working condition are the subject of a paragraph on page 246.

The *Board of Trade Journal* mentions that a Canadian-company is now manufacturing blanc fixe. (P. 255.)

Paper for X-ray photography and a design of camera for obviating double exposures are among the patents of the week. (P. 253.)

Some hints on the preservation of apparatus are given by a contributor in a note on page 252.

Permanence of bromides, business registration, markings on negatives, prints for colouring, the Callier copper intensifier, blackening metal sheaths, and M.Q. developer are topics which are the subjects of brief replies to correspondents. (P. 255.)

EX CATHEDRA.

Co-operative Holidays. The example afforded by Edinburgh photographers in arranging among themselves a common time for the closing of studios and for assistants' holidays, is one which might well be followed in other places. Last year the same plan was followed in several places, *e.g.*, in Northampton and Dorking. It is, therefore, pretty clear that, given goodwill on the part of the photographers, the scheme is applicable to places large and small, and it is to be hoped that there is ample time between now and August for many other towns to follow suit. Will those who take the lead among their brethren in a district let us know about it; their initiative will stimulate others. While no one expects holidays to be what they were, photographic assistants on the whole have worked hard under conditions which to many of them have been strange. Neither they nor their employers will be any the worse for a few days' relaxation, and the communal closing scheme seems a way of securing it with the least difficulty.

* * *

Customers' Originals. One of the minor worries of many photographers is the responsibility for the safety of original photographs, drawings, or miniatures entrusted to them for copying. Unless there is some system for keeping them safely, this particular class of article has a wonderful knack of getting mislaid, soiled, or injured, with the result that even if no claim for damage arises there is considerable unpleasantness and a loss of reputation for the photographer. The only safe way is to regard each "original" as a valuable piece of jewellery, to be locked up as soon as it is received, only to be given out when the actual copying is being done, and then to be promptly returned to safe keeping. We have in mind a case where an old glass positive was brought in for enlargement. It was left unprotected upon a table, became covered with a letter and had a heavy paper weight dropped upon it, with the result that it was reduced to splinters. The situation was saved by cementing the pieces together, copying and enlarging in accordance with the original order, and having a wet collodion copy of the enlargement made to replace the original in the frame. The cost of this extra work more than swallowed up the profit on the entire job, yet all this might have been averted by a moment's care in putting the positive in a place of safety. Copying is usually regarded as a bore by operators, and originals often lie about in the studio for weeks before an opportunity is made to deal with them, with the result that their appearance is not improved when they are returned, and, worse still, sometimes they disappear altogether. It is a simple matter to place each in a separate plate box, and to stick a gummed label on the lid giving full particulars of the order. If treated in this way it is next to impossible for them to be overlooked or injured. Another thing which is often omitted is the re-sealing of daguerreotypes or miniatures which have to be taken out of their cases or rims for copying. This was formerly done with goldbeater's skin, which can be obtained from most chemists, but, if unobtainable, the thin gummed paper used for mending music answers nearly as well. It is not fair to the owner to return his picture in a less protected state than that in which he brought it.

* * *

The Portrait Studio. We are glad to hear from our publishers that a third edition of the little manual, "The Portrait Studio," has just been called for. Since its first issue exactly two years ago this miniature handbook on the design and equipment of the daylight studio has constantly recommended itself to photographers desiring essentially practical advice on the features of size and design which a studio should possess to make it most serviceable for everyday portraiture. The need for a manual of this kind is felt when contemplating the leasing of a new place of business or alterations to existing premises, for it is frequently overlooked that dimensions of length and breadth which are ample in the case of one type of studio are decidedly insufficient when the light reaches the sitter in a different way. And then the effect of surrounding buildings is one which requires to be considered in reference to the pattern of the studio. It is, no doubt, on account of its helpful guidance in such matters as these, and in the fitting of the studio with blinds, curtains, wall and floor coverings, etc., that two successive editions of the manual have been rapidly exhausted. The third edition is exactly the same, but owing to great advances in the cost of paper its price is higher, viz., ten pence, post free.

* * *

Making and Keeping Developers. We have noticed from time to time a considerable difference in the behaviour of developers, particularly pyro-soda, which were made to practically the same formula by different people. This difference appears to be due not to any difference of quality in the constituents, but to variations in the methods of compounding. The usual procedure is to dissolve the sulphite in hot water often used directly from a geyser or similar device, and as soon as solution is complete (sometimes before) to add the pyro to the warm solution. If metabisulphite be used in addition it is often dissolved at the same time as the sulphite, with the result that some of the free sulphurous acid is driven off, and the effect of the addition is proportionately nullified. If we compare a solution mixed in this way with one made in a more rational manner a very considerable difference in energy will be perceptible, and as energy is what we pay for, it means economy in expenditure in chemicals, besides an improvement in the quality of the negative. The first step to be taken is to boil the water thoroughly and then to allow it to cool, and to precipitate as much of the suspended lime as possible. Of course, if distilled water be used this is not necessary. The next step is to pound the sulphite in a mortar till it is reduced to a coarse powder. This only takes a minute or two, and greatly facilitates solution. The metabisulphite may be powdered at the same time, and the whole dissolved at quite a low temperature. The pyro is then added, and dissolved with as little shaking as possible. The same precautions should be observed when making sulphite solution for amidol developer, and a noticeable improvement in the colour of the solution and keeping qualities will result. Another point is the degree of concentration of stock solutions. When an ounce of pyro can be used up in a day or two the practice of making the solution of working strength may be followed, otherwise it is better to use one-fourth this bulk of water and to dilute for use as required. Such concentrated solutions keep their energy much longer than weak ones, and, moreover, allow of considerable modification of the strength and proportions of the working developer.

EXAMINATION PAPERS IN PHOTOGRAPHY.

On another page we print the questions set by the examiners in photography for the City and Guilds of London Institute, and, in connection with the answers which we append to them, it may be of some service to photographic students who still may be entering for these examinations to add a few words which will, perhaps, be of value to them, and some which perhaps we may be allowed to address to the examiners. It should be understood by students that the general purpose of these examination papers is not to elucidate the candidate's knowledge of how such and such photographic operations are carried out, but, broadly and mainly, to ascertain the candidate's knowledge of the principles upon which photographic processes and operations depend. While of late years it has been the general rule to depreciate the value of examinations as a criterion of the efficiency of instruction in technological subjects, we venture to think that, taking photographers as they are, there is still a wide field of usefulness for the written examination paper as a test of knowledge and as an incentive to study. We know—better, perhaps, than most people—that those engaged in photography as a business are notoriously bad students of the principles of their craft, that many of them, indeed, if they were asked point blank, would have to admit that they had never read a text-book on photography. In making that censure we draw no sharp distinction between assistants and masters. If any distinction is to be drawn we think there is little doubt that more students of books will be found among a hundred assistants than among the same number of masters. In such circumstances there is obviously every reason to maintain a system which offers, in the shape of a certificate or medal, a certain inducement to study the manuals of the photographic craft, and we ourselves should consider it a retrograde step for the written examination paper to be omitted from the tests of efficiency and instruction which can be conveniently applied. While students' success in examinations should not be the basis on which monetary support is granted to educational institutions or to teachers themselves, examinations still remain an element in photographic instruction which is an entirely healthy one, and therefore to be encouraged.

The student will gather from these remarks, as well as from the answers to the questions, that long answers are by no means necessary: a short answer is quite sufficient to show that the candidate knows his subject, and it may do that even though it may not be a precise answer to the question asked, though, obviously, it should, as far as possible be exactly of this required form. In the ordinary grade of the City and Guilds examination practically all the questions are based year by year on what may be called the everyday methods and processes of photography. While the student is not supposed to have a knowledge of the chemical principles of processes, yet one of the chief purposes of the examination is to lead him to become something superior to the rule-of-thumb worker. For example, in regard to the intensification of a negative, he is required to know, not simply that the negative is whitened by the mercury solution and blackened by the ammonia, but why it is whitened and blackened, even though he is not assumed to be familiar with the chemical compounds which figure in these processes. In the same way he is expected to have some reasonably clear idea of the essential difference which exists between the sensitive surface of a gelatine gaslight paper and that of platinotype paper. Such considerations as these will be the means employed by the examiner of testing the intelligence of thought which is applied by the student to the materials and processes with which he has to do.

In the advanced or final grade, however, of the examination, the field is both wider and deeper; wider, in that the student is expected to be familiar with methods and processes which do not come within the regular routine of photographic work, and deeper, in the sense that he is expected to have a knowledge of the chemical, physical, and optical principles which govern processes, or are the basis for the construction of instruments. Although this is the case, the examination is still one which is fairly within the scope of the advanced student of everyday photography, inasmuch as only seven questions out of a total of twelve are to be attempted. It will be seen from the paper on another page, as well as from those of previous years, that it is possible to select seven questions without going into what may be termed the more specialised branches of photographic knowledge. Nevertheless, the candidate in this grade may be well advised to be a student, not only of the more advanced manuals of photography, but also of the papers and contributions on the subject published in the photographic Press within the previous five or ten years.

In the two papers of questions which we publish there are, we think, one or two instances in which the examiners are by no means as definite as they might be. In No. 6 of Grade I. it is not entirely clear whether the question relates to an actual developing solution or to a formula for a developer. In our answer we have assumed that the question means what it says, but where precision in replies is expected in answers it might at least be conspicuous also in the questions. Similarly, in regard to No. 11 in Grade I., it is open to doubt whether the examiner really intended only to ask as to the mechanical advantages of development in a tank over development in a dish. If it were intended to question the candidate as to the advantages of the so-called "tank" or "time" system of development the question should have been more precisely worded. But in the questions set in Grade II. there are two which we think depart somewhat from what examination question on a subject like photography should be. In No. 8 the student is asked to describe how he would fit up a small room for developing, fixing, and washing, and also for storing chemicals, solutions, plates, and paper. We hope that every candidate was courageous enough to suggest to the examiners that a room such as this was about the worst place for storing plates and papers; we think that would be a better answer than would any attempt to describe means of enclosing such materials in damp-proof receptacles. No. 10 is a question which ratner mystifies us. No one, we imagine, who left an ounce or two of ammonium persulphate insufficiently sealed for several months would then care to endanger negatives of any value by using it as a reducer for them, the only use for this salt in photography. Even if they did, they would not want a solution stronger than five per cent., yet, to pursue the problem to the extreme set forth in the question, the data which are given are not of the form from which the quantity of the persulphate contained in a given volume of presumably saturated solution can be accurately calculated. It may be supposed that these two questions are in the nature of "catches," designed to test the student's sharpness, to provide a test for individual intelligence, and to penalise the habit of repeating facts by rote without understanding them. There may be reasons for exercises of this kind, but we cannot help feeling that as a means of benefiting the student of photography, who most stands in need of encouragement, questions of this kind are best left alone. They impose a difficult task upon the teacher, who may be asked by a would-be candidate what is the exact significance of such knowledge in the real business of photography. Still they are so few and far between in City and Guilds papers that they do not materially affect the educative value of these papers on the whole.

STUDIO APPARATUS.

The young photographer who has finished his apprenticeship or training, and desires to make a start on his own account, is faced with a somewhat troublesome problem in selecting the cameras and lenses which are essential to his work. Frequently he has to pay dearly for his lack of knowledge, finding either that he has acquired very unsuitable apparatus or that he has gone to quite unnecessary expenditure over goods which are satisfactory in themselves, but needlessly large and expensive. It is not safe to trust altogether to the advice of the dealer or his assistants, for most of these good people, while perfectly honest in their intentions, have little or no experince of studio work, and are, therefore, not in a position to give practical help in the matter. The best plan is to decide upon the essential requirements in the first place, and then to look round until apparatus which embodies them is discovered.

The first point to be decided is the maximum size of plate to be used. In nine cases out of ten, twelve inches by ten will be the most useful; larger sizes are rarely made direct nowadays, and for most studios the "twelve-ten" camera takes up quite enough room and is quite heavy enough to move about with comfort. A camera of this size should have one or two slides for the full-sized plate, with inner carriers for ten by eight and whole plates, and should be fitted with a removable back to take a slide which carries two half plates side by side; or one, an inner carrier of a half plate horizontally, so that two cabinets or two c.d.v.'s can be exposed in rapid succession. Not fewer than two such slides should be provided, although half a dozen is not too many on a busy day, especially when the photographer is single-handed, and has to change his own plates. Single slides are preferable to double ones for studio use, as they are more quickly filled, and there is less risk of double exposures.

In some studios the whole-plate camera is deemed large enough for the indoor camera, this being supplemented by a twelve by ten outdoor instrument when larger negatives are needed. The slides for a whole-plate studio camera should take two half-plates side by side, the whole-plate being rather too small for a repeat of two cabinet poses. If a ten by eight camera can be procured reasonably the slides can easily be adapted; the ten by eight size is, however, seldom used now, as it is difficult to get a better price for a photograph of this size than for a whole-plate.

Smaller cameras than whole-plate are usually only employed for sticky-backs, and come into a class of their own, the usual type being one taking four negatives upon the half of a half-plate, cut lengthwise.

The stand should be a firm one, and, if possible, of the two-pillar type, of which the "Semicentennial" and the "Hana" are good examples. These permit great latitude in height, it being possible to bring the camera very low for children, or to raise it high enough for the tallest standing figure.

The lens is an all-important part of the outfit, and *much money may be wasted by an unwise choice, either by selecting a poor instrument at a low price or by paying a big price for one which is never used to its fullest advantage. In most well-equipped studios, the lens used for cabinets has a focal length of from 14 to 16 inches, and this will also serve for whole-plates if needed. In short studios it is sometimes necessary to use a 10½-inch or 11-inch lens, but it is not desirable to do so if it can be avoided. The longer focussed lenses may be of the "portrait" type, but shorter ones are preferably of the f/4.5 anastigmat construction. It must never be forgotten that the focal length of the lens, and that alone, controls the perspective of the picture. We have known several cases where a photographer has been bitterly disappointed to find that an expensive anastigmat has given no better perspective than he was getting with his old portrait lens of the same focal length. In order to be able to utilise all lenses to the fullest extent it is a good plan to have one of the lens front panels of the camera cut and rebated to take the lens panels of the outdoor camera. This will be found very useful when copying, or if very small figures are required, for locket or Christmas card work.*

The outdoor outfit should consist of at least two cameras, and the most useful sizes are 12 x 10 and half-plate. The parallel bellows pattern should always be selected, unless lightness is the principal consideration. Conical bellows cameras are lighter than the parallel form, but that is their only merit. As regards lenses, a good rectilinear of 17 or 18 inches focal length, and an anastigmat of about 8 inches, for wide-angle work, will be a useful selection, as the latter will serve as a rapid lens for the half-plate outfit, and as a c.d.v. lens for the studio. A 5-inch anastigmat will also be found useful for wide-angle work on the half-plate.

From time to time reflex cameras have been recommended for studio work; but, except for certain classes of child portraiture they are not of general service. A small reflex is a very useful supplementary camera, but the large ones, built specially for portraiture, are best left alone.

A small item of equipment often omitted is a focussing eyepiece; this is a very useful item, and in focussing saves much eye-strain. One of good quality of the Ramsden pattern should be provided and permanently set to the user's eyesight. The focussing screen should be rubbed with a little salad oil and the surplus wiped off with soft paper. This greatly facilitates focussing.

Nearly everyone now uses a shutter for exposing, the cap being troublesome, especially with children. Single and double flaps, the hemispherical bellows, and the Packard Ideal patterns are all satisfactory, and may be used with a ball and tube or "Antinous" release, as desired. The ball and tube is the most pleasant to use, but there is always the bother of leakage, which the "Antinous" avoids.

THE POSITION OF THE ILLUMINANT IN ENLARGING AND PROJECTION.

It used to be stated in text-books, or, at least, implied by the diagrams given, that the correct position for the illuminant is such that the condenser brings light-rays to a focus at the first node of the objective. This idea has been proved erroneous, and, in fact, practically impossible with the ordinary uncorrected plano-convex compound condenser. The modern teaching is that the illuminant should be so placed that a small image of the light-source is formed a short distance ahead of the objective; while, if the latter is removed, a similar, but less defined, image is formed near or at the screen.

The rationale of the second method of adjusting the light, however, is seldom properly understood. Many have an impression that the condenser and objective form, in some way, a single corrected optical system, giving uniform illumination. This is correct as far as it goes, but it is not the real explanation, and does not meet all cases, for the reasons to be given.

Whatever may have been the case with early lantern slides, made for use with poor illuminants, the modern slide is not very transparent, neither, for that matter, is the average negative, still less an up-to-date cinematograph film. True, there may be a tiny patch or two of clear glass or bare celluloid, but these merely occupy an insignificant portion of the picture. What follows, then? If the negative, slide, or film is at best only semi-transparent or almost translucent, it must be regarded as to some extent constituting (in conjunction with the condenser) a diffusing medium, graduated so as to compose the various tones of the picture. Now, if the negative, slide, or film, with the condenser, is practically a graduated diffusing medium, it is evident that the chief object to be attained is to illuminate this from behind as evenly and as brilliantly as possible. Other things being equal, this end is secured by bringing the illuminant nearer, since, besides the increased light naturally due to greater proximity, a wider cone of rays then enters the condenser. The adjustment is much simplified in the case of the enlarger and the optical lantern by the fact that the negative or slide is close to the condenser, and therefore receives the beam of light before any portion can come to a focus.

In the case of the cinematograph, where the film is a little distance away from the condenser, instead of being close to it, the factors are different, since the position of the illuminant is partly dependent on that distance, the beam of light having to be concentrated in a small disc on the "gate," in which is the film-aperture or "mask." With that exception the same argument applies.

Both the old and the new method are easily experimented with. For the first, the position of the illuminant may be approximately found as follows. Focus the negative or slide sharply on the easel or screen. From the ratio of enlargement calculate the minor conjugate, and measure an equal distance from the slide or negative, marking it on the bench. This, of course, is the first node. Remove the slide or negative and also the objective, and move the illuminant till the best possible image of the light-source is focussed on a white card supported level with the mark. Then replace the objective and re-insert the slide or negative. In practice this arrangement will be found to give a very fair illumination, quite decently uniform, not because the old theory is anywise right, but from the fact, as before explained, that a slide or negative of average density acts, in conjunction with the condenser, as a diffuser, and is in effect an illuminated object, like a stained-glass window or a lit-up clock face. This method has, at any rate, the merit that the light is further from the condenser, and a cracked condenser less probable, though the maximum illumination is obviously not obtained.

Now, having tried the first way, without altering any of the other adjustments, gradually approach the illuminant to the condenser, watching the easel or screen. The increased light on the latter will at once be noted. When the most even result is obtained, remove the negative or slide and hold the white card a few inches in front of the objective. A small image of the light-source will be focussed on it at a certain distance, showing that the second ideal adjustment has been reached. It will be found, however, that this distance may be varied somewhat by moving the light nearer to or further away from the condenser, without particularly affecting the evenness of the lighting, provided the slide or negative is sufficiently dense, which goes to prove the soundness of the conclusions here suggested.

A. Lockett.

EXAMINATION QUESTIONS IN PHOTOGRAPHY.

[We print below the questions set in the two grades of the examination in photography recently held by the City and Guilds of London Institute, and have appended to each question the answer such as a student in Grade I. or II. might reasonably be expected to give. In one or two cases the nature of the question gives a good deal of license as to what the answer shall be, but in the majority of instances the answers which we print will no doubt be of interest to students who may still be contemplating entering for these examinations in future.—Eds. "B. J."]

Grade I.—Pure Photography.

1. When the following are well washed and dried in the dark, if they are affected state how, and what will remain in the film or on the paper in the case of (a) a piece of print-out paper (P.O.P.); (b) gelatino-bromide plate; (c) a piece of platinotype paper. (60 marks.)

(a) No visible change. Film after washing contains silver salts, e.g., silver chloride, which are insoluble, soluble silver compounds (nitrate and possibly some citrate) being removed. In case of gelatine papers, film is harder after drying.

(b) No change, except that gelatine emulsion coating is harder after drying.

(c) Yellowish colour is more or less completely removed, due to iron sensitising salts being dissolved out together with platinum salts. Washed paper will contain some iron salt.

2. In reducing a whole-plate transparency to get quarter-plate negative, using a lens of six inches focal length, what will be the distance from the centre of the lens to the transparency and to the quarter-plate? Give your calculations in full. (30.)

Reduction is 2 linear. Therefore distance from lens to transparency will be 1 focal length + 2 focal lengths = 18 inches.

Distance from lens to sensitive plate will be 1 focal length + ½ focal length = 9 inches.

3. In the operation described in question 2, what condition or conditions must be complied with in order to get an undistorted image on the quarter-plate? (30.)

Surface of transparency must be parallel with that of sensitive plate. Also lens must be "rectilinear," i.e., free from the curvilinear distortion of a single lens or of some doublet lenses.

4. What are the uses of a swing-back to a camera (a) in portraiture in the studio; (b) in landscape work; (c) in photographing buildings? (35.)

(a) For securing depth of focus at large aperture of lens, e.g., of hands and knees as well as face of seated figure.

(b) In landscape work, one use is similar to (a), viz., obtaining near or distant planes of the subject in focus at the same time without stopping down greatly; also for keeping plate level when camera is tilted as in (c).

(c) For preserving plate in vertical position when camera is tilted upwards or downwards and so avoiding convergence of what should be parallel lines of the building in the negative.

5. What will be the result on a print made from a negative if the negative plate had specks of dust upon it during exposure? (25.)

The result on the negative will be minute light spots which will be negligible as a rule except in an even sky or other even area of medium density.

In the print the spots will show as correspondingly dark, the defect being most marked in prints on glossy paper and often of no account in prints of matt or rough surface.

6. Supposing that a certain pyro-soda developer gives stained plates. How would you modify it to prevent its staining tendency? (25.)

If pyro solution is made up of working strength (i.e., for mixing with equal volume of carbonate solution) and also is much discoloured, do not see how to remedy the staining. Might try dissolving more sulphite in pyro solution, but doubtful of result. If pyro is made up stronger (for dilution with water) should use soda sulphite solution in place of part of the water, in order to counteract oxidation of pyro when in weaker and alkaline solution.

7. Describe any method of intensification that you prefer, and explain clearly why the image is made more dense by the process. (45.)

The negative is bleached through to the glass in solution of mercury bichloride, well washed and then put in weak solution of ammonia.

The image is made denser by a white mercury compound forming on the particles of the silver image, which compound is then turned black by the ammonia.

8. If a gelatino-bromide print were of a rusty greenish colour instead of a black, what would this indicate? Could you alter the print in any way so that it should not be wasted—if so, how? (30.)

Under-exposure; or, on the other hand, developer containing too much bromide or contaminated by traces of hypo.

Yes, by treating the print with the chromium intensifier (made up to give the least degree of intensification), i.e., bleaching with solution of potass bichromate and hydrochloric acid, washing until free from yellow bichromate stain, and re-developing with (preferably) amidol developer.

9. Assuming that you are given a landscape negative and a cloud negative, describe concisely how you would make from them a combination print on P.O.P. (25.)

If the sky of the landscape negative is of such density that it prints white, a print is first made as usual. But if the sky is thin, this part of the negative is blocked out on the glass side with an opaque mixture, applied with a brush to the outline of the landscape portion. A print from the negative is then made by diffused light, if necessary with a thickness extra of tissue paper over the printing frame. The print is then put in a frame behind the sky negative, which latter is provided (on the glass side) with a mask to cover the landscape portion of the print. This mask is most easily made from a rough print from the landscape negative, with the sky portion cut away from it and the paper then allowed to darken in the sun. It is fixed to the sky negative with a touch or two of gum, and the landscape print adjusted in the frame to register with it. On then printing, by diffused light, the sky is imprinted on the landscape print.

10. What is an emulsion? (30.)

Generally, a mixture of exceedingly fine particles (of a solid or liquid) with some liquid or semi-liquid substance. In photography, a mixture of silver bromide, chloride or iodide suspended in a very fine state of division in solution of gelatine, or in collodion.

11. What advantage has development in a "tank" over development in a dish? (25.)

Some advantages of tank development are: more convenient and compact handling of plates in quantity; shielding of plates from possibly unsafe dark-room light during development; less liability to damage of emulsion coating through careless handling.

12. State and describe the disadvantages of a spectacle lens, when used instead of the lenses made specially for the purpose, in practical photography. (30.)

The size of plate covered is very small, relatively to the focal length of the spectacle lens, and the lens cannot be used at an aperture much greater than about f/16. But the chief drawback is that a spectacle lens does not work to focus, *i.e.*, image focussed sharply on ground glass will not be sharp in negative.

Pure Photography—Final Examination.

1. Compare the chromium, mercury and ammonia, and mercury and ferrous oxalte methods of intensification, and state in each case *why* the image is made more opaque. (50 marks.)

As regards degree of intensification (at one application) mercury-ammonia has greatest effect; the other two, about equal, but can yield practically any degree of increase of density by repeating the process.

As regards reliability and permanence of result, mercury and ferrous oxalate first; chromium, very little inferior, but mercury-ammonia greatly inferior in both respects.

In the case of chromium, increased opacity of intensified image is due to deposit of a chromium compound with the silver re-obtained by re-development. In the case of mercury-ammonia, bleaching of the silver image forms silver chloride and mercurous chloride, a quantity of each chemically equivalent to each part of silver in the image. On treatment with ammonia the mercurous chloride is converted into a dark mercury-ammonia-chlorine compound, whilst the silver chloride is partly dissolved. From this latter fact the process is somewhat erratic, also on account of the not very regular action of ammonia on mercurous chloride. In the case of mercury and ferrous oxalate, the intensified image consists of metallic mercury and silver, and serves for repetition of the bleaching and darkening process equally as the original image.

2. What is resolving power? State what you know about the resolving power of photographic plates. (45.)

Resolving power is the capacity (of an optical instrument or a plate) to record fine structure sharply, e.g., fine lines in a spectrum, near stars in a stellar photograph. A measure of resolving power is the distance between two fine lines which are "resolved" as two, not merged into one.

The resolving power of photographic plates varies greatly with the type of plate. Since resolving power is dependent partly on the size of the grains of silver bromide in emulsion, plates of fine grain, such as those of the "lantern" or "process" type, as also the plates for Lippmann colour photography, possess high resolution. As it depends also on the degree of transparency of the emulsion film it does not necessarily follow that a plate of given fineness of grain is equal in resolving power to one of the same quality in this respect. Thickness of film and rate at which the emulsion yields a heavy deposit of density also contribute to variations in resolving power.

3. Draw curves showing approximately the sensitiveness of (1) ordinary, (2) isochromatic, (3) panchromatic plates to the solar spectrum, and describe the effect of a deep yellow screen (e.g., a "10 to 12 times screen") in each case (40).

Plotting the spectrum in steps, each of 500 Angstrom units of wave-length, from the ultra-violet (3,000 to 4,000) to the red at 7,000, fig. 1 is the type of sensitiveness of the ordinary (non-colour sensitive) plate, i.e., very considerably in the ultra-violet, with the maximum in the blue-violet and very rapidly falling off to nil just about at the green part of the spectrum.

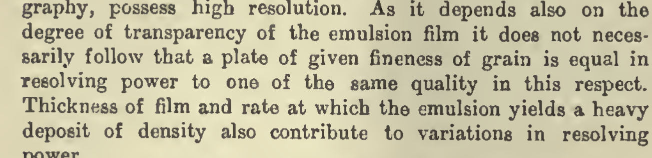


Fig. 1.

Fig. 2 represents the sensitiveness of the average orthochromatic plate (sensitised with erythrosin), pretty much the same as an ordinary plate up to 5,000, but then showing fair sensitiveness through the green with a characteristic drop about the line 5,300.

In the case of the panchromatic plate (fig 3), the colour sensitiveness is greater in the green and extends through the orange and red.

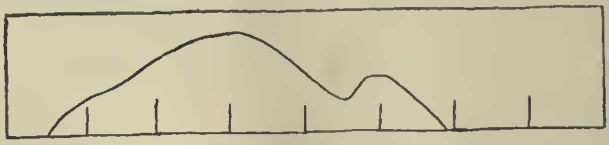


Fig. 2.

A deep yellow screen such as used as a light-filter in orthochromatic photography will cut off the whole of the ultra-violet (up to about 4,000) and a large proportion of the blue-violet. It will, therefore, enormously prolong the exposure of an "ordinary" plate without any appreciable gain in colour-sensitive effect.

In the case of an orthochromatic plate, owing to the cutting out of the ultra-violet, the sensitiveness curve will begin about 4,300, will rise fairly steeply to a maximum about 4,700, and will then resemble somewhat that of the unscreened plate.

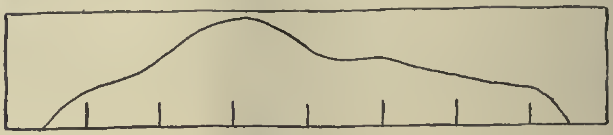


Fig. 3.

Owing to the absorption of ultra-violet and blue-violet the maximum of the curve in fig. 3 will be shifted considerably towards the red end of the spectrum, say, to between 5,000 and 6,000 (in the green), whilst the curve will start about 4,500 in the blue violet.

4. Describe concisely the method of preparing a gelatino-bromide emulsion, stating particularly which of the ingredients, if any, is to be added "in excess," and exactly what you mean by saying that a particular substance is to be added "in excess." The object or effect of all operations described should be clearly stated. (35.)

The customary method is to dissolve potassium bromide with, in some cases, a small quantity of potassium iodide in a solution of part of the gelatine. This mixture is then made moderately warm and addition made to it of solution of silver nitrate also at the same temperature. The silver nitrate is added in very small doses with constant stirring and in quantity so that there remains an excess of potass bromide, "excess" meaning bromide in excess of the quantity required to form silver bromide with the silver nitrate. After digestion of the mixture at a moderate heat for some time, addition is made of a further quantity of gelatine solution. The emulsion is then allowed to cool and set, and the jelly is then squeezed through canvas or otherwise broken up so that it can be washed in water to remove the soluble salts, e.g., the potass nitrate from the double decomposition of silver nitrate and potass bromide, together with the excess of potass bromide. It is then ready to be re-melted for coating, or to be stored for use in admixture with another batch of emulsion, as done to secure uniformity in speed and other qualities of plates or papers.

5. If you use an eyepiece, or would use one, in photo-micrography, explain the advantage of so doing. Or, if you do *not*, or would *not* use an eyepiece, give your reasons for so doing. (45.)

I should use an eyepiece because it permits of focussing being performed on a clear glass screen, which is a matter of importance with a feebly illuminated subject. Also with an instrument which requires such delicate adjustments it is an advantage to have the eye steadily fixed at a short distance from the screen, whether ground or plain. Naturally an eyepiece for this purpose should be approximately achromatized.

6. With what is paper for platinum printing coated? State, in general terms, the changes in the substance with which it is coated

that take place on exposure and on development. Why is the developed print washed in weak acid? (35.)

The essential substances of the sensitizing solution are ferric oxalate (per-oxalate of iron) and a platinum salt, such as potass or soda chloroplatinite.

On exposure the action of light on the ferric oxalate is to reduce it to ferrous oxalate, which in the dry paper is practically without action in the platinum salt. It is, however, instantly dissolved by the oxalate of potash used as "developer," and so instantly reduces the platinum salt lying next to it to black platinum metal.

Acid is used for the successive washing baths of the developed prints, since the unaltered ferric oxalate is not freely removed from paper by plain water, whilst the iron resulting from the ferrous oxalate image still more needs acid for its removal.

7. State the reactions that occur in reducing a negative (a) by means of "Farmer's" solution, (b) by means of ammonium persulphate. (35.)

Farmer's.—The silver image of the negative is converted into silver ferrocyanide by the ferricyanide in the reducer; and this ferrocyanide, as fast as it is formed, is dissolved by the hypo.

Ammonium persulphate directly renders soluble the metallic silver of a negative image, converting it probably into silver sulphate.

8. Given a room 8 ft. by 6 ft. and 10 ft. high, describe how you would fit it up for developing, fixing, and washing prints on paper and negatives, and for storing the various chemicals, stock solutions, plates and paper. (25.)

If there is a window in the room, it is best to fit it with a light-tight black blind or easily removable shutter, in order to flood the room with daylight at will. The space immediately in front of the window had better be utilised for a low earthenware or lead sink for the washing of dishes, graduates, etc., and when need be for operations like reducing, intensifying, which call for a good light. Assuming that window is midway in one of the 8 ft. sides, I should arrange a bench to carry sinks for developing, fixing, and washing, arranging the two last along the wall next to that of the window, and the first to join the second, but along the wall facing the window, the developing sink to be fitted with a stout wooden grid, the fixing and washing dishes or tanks to stand in the other two sinks. Illumination, preferably ruby lantern of vertical type for plates on the developing bench; also lamp giving orange light directly downwards for papers. A white light to be available when required close over fixing sink in order to avoid splashing hypo in room by carrying negatives or prints elsewhere to look at them.

Narrow shelving for stock solutions and chemicals, and plates and papers not to be stored in the room on account of rapid deterioration from damp and from certain chemicals, such as sulphide.

9. Describe a practical safe-light for (a) very sensitive plates, (b) isochromatic plates, (c) Lumière colour plates. Give a method of making suitable light-filters for the purpose. (30.)

For a safe-light for any plate, one advisable dye is tartrazine, which cuts out very completely the ultra-violet and practically all the blue violet. In order to ensure the complete cut-out of this latter and to produce a bright red safe-light which can be used for the most rapid ordinary plates, it is combined with a dye such as pinatype red, absorbing light of all wave-lengths below about 5,600.

In the case of an isochromatic plate, it is necessary that the safe-light should transmit only rays somewhat further towards the red, for which purpose a suitable combination is tartrazine and methyl violet.

Autochrome emulsion being of low general sensitiveness, but sensitive through the green and red, the most practicable safe-light is one of very low intensity, which cuts out ultra-violet and blue-violet and transmits a narrow band in the green. Tartrazine with some acid green and naphthol green forms such a safe-light, although of a relatively low degree of safety.

A suitable method of making safe-lights is to dissolve the dyes in known quantities in gelatine solution or collodion (one or the other, according to the dye), to flow the solution on to glass plates, binding two together with interposition of tissue-paper or other diffusing medium.

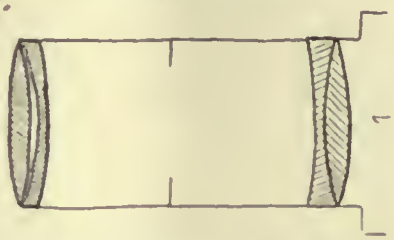
10. A bottle containing several ounces of ammonium persulphate has been allowed to remain lightly corked for several months: what would be the result, and how would you prepare from the contents of the bottle 10 ozs. of a 20 per cent. aqueous solution, the salt being soluble at the rate of 0.6 parts in one of water? (25.)

Persulphate readily absorbing moisture would almost certainly be very damp, wet or even partly converted into a saturated solution of the salt. Probably also partly decomposed.

For 10 ozs. of 20 per cent. solution, 2 ozs. of dry salt are required. If this weight is not obtainable by draining wet crystals from adhering solution, a very rough attempt may be made to obtain the balance by reckoning that the fluid ounce of the saturated solution contains 6 ozs. Av. of the persulphate. This is not accurate, as it ignores increase of bulk of water on solution of persulphate, but it is the best that can be done from data.

11. Give as near as you can a plan of an ordinary (Petzval) portrait lens, and describe the relative advantages of such a lens and a modern anastigmatic lens. (45.)

The front combination consists of a double convex crown glass cemented to a double concavo or plano-concave flint glass. A very shallow concave rear surface of the front lens was the original form; other constructors have made it flat. The rear combination consists of a concavo-convex flint glass, separated by an air space from a double convex crown.



Compared with modern anastigmats, its advantages are greater thinness of glass elements, very fine definition (but over a much smaller field than an anastigmat of same focal length): great rapidity—greater than most anastigmats. On the other hand, where very great flatness of field is required, and particularly when a larger plate is to be covered at a medium stop, the anastigmat is unexcelled.

12. Give working particulars of a method of illumination by electric light for portraiture. (40.)

One method consists in the use of two, four or six open arcs mounted in conjunction with a large white umbrella-shaped reflector. The whole of the light on the sitter is obtained by reflection from the inner surface of the umbrella reflector. The whole installation, arcs and reflector, is mounted so that it can be moved about the studio, any direct light from the arcs being cut off by a shield, although it has been recommended to allow a part to pass through an adjustable aperture in order to provide a certain proportion of direct rays for the sake of bright accents in the lighting.

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The Wellington Handbook.—By a literal error in our issue of the 17th it was made to appear as if the Wellington handbook there reviewed might be obtained from professional photographers. It should be made clear that the volume is obtainable free only by professional photographers, to others the charge is 1s.

One-Man Portfolios.—The Executive Committee of the Affiliation of Photographic Societies is engaged upon the formation of a series of one-man collections of prints (portfolios) for circulation amongst the affiliated societies. Several well-known workers have already accepted the invitation of this committee to lend a set of their prints for this purpose and to contribute some descriptive notes concerning them. These portfolios are to be kept in circulation for about twelve months, and will be available by the commencement of the autumn session. They should prove an interesting and attractive feature at societies' meetings, and, in addition to their educative value, promote some useful discussions.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

The Care of Apparatus.

Few photographers seem to pay sufficient attention to the condition of their apparatus, or, perhaps it would be more correct to say, of assuring themselves that it is in good working order, until the loss of some exposure, which is hard or impossible to replace, points to the advisability of such a course. I always give my instrument a look round at least once each week, to be certain that it is in good working condition, since on one occasion neglect of this precaution lost me a most important negative, through a hole in the bellows caused by the struts which carry the front, when folding up the camera in a hurry. Had this been seen at the time, it could easily have been rectified, but it was not, and experience now insists on more care in the future in this direction. It is quite simple to rack the camera out fully, and take it into the dark-room, placing inside an electric light bulb, or failing this one of the cheap flash lamps; any holes or loosened joins caused by wear will at once be easily detected and repaired. Special attention should always be given by all would-be successful operators, especially during hot or showery weather, to the points where the bellows are attached to the camera, as these conditions are apt to produce a softening effect on the glue. If the camera is one of the "tropical" variety this is not likely to happen, as the bellows are fixed in most cases with a strip of brass lead, screwed over them after glueing; but as we are not all so well blessed with this world's goods to enable us to possess such apparatus, the point noted above is worth attention. Then again, how many pay sufficient attention to the lens? I once met an operator fuming inwardly because he could not focus sharply with a strange camera. Upon examination it was found that the back combination of the instrument was thickly covered with a fine film of moisture, owing to the fact that the camera had been used a day or two before, and instead of being opened out upon arriving home after a wet journey, was left shut up in its case by a careless operator, with the inevitable result. No wonder apparatus deteriorates, for damp is a real enemy to the lens. The first thing that any operator should do upon arriving home after a wet journey is to open out his camera and wipe it dry, if damp, taking especial care to ensure that the lens is not left in a moist state. The camera may be left to dry in a warm place without much ill effect provided it is opened out in order to assist drying, but the lens must never be neglected in this respect.—Expert.

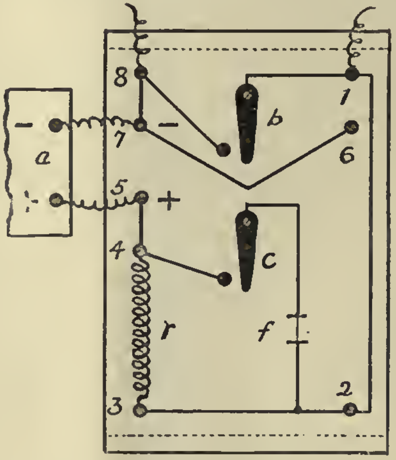
Charging Accumulators on a Printing Mercury-Lamp Circuit.

There may be some who employ the mercury-lamp for printing, to whom it may be useful to point out a practical method of charging portable accumulators in series with the tube or tubes, which allows the accumulator to be placed on charge or removed when the lamp is running without breaking the circuit. The method requires an ammeter and adjustable resistance in the lamp circuit, in all cases most advantageous and almost compulsory if on alternating supply with a rectifier. The cost of charging is *nil*, which is not the case with the somewhat wasteful practice of charging off a high voltage main through a carbon filament lamp, or lamps.

Approaching a scientific electrician some time ago for a scheme for the purpose resulted in such a brilliant display of mathematics, including calculations for counter E.M.F.'s, as fairly to frighten the writer, but eventually a simple arrangement was evolved which has worked well. The charging board looks complicated in the diagram, but is not so actually, and it can be made by anyone. The outer lines represent a thin board about 12 by 8 inches, with a narrow strip (shown in dotted lines) screwed on underneath at each end. Eight terminals occupy positions numbered 1 to 8. The board will look neater if the connections indicated by straight lines are made underneath it. No. 20 gauge insulated copper wire is sufficiently stout, or even electrical bell wire will answer. The two switches *b* and *c* are of lever or of tumbler type; *f* is a fuse, or *c* can be a combined tumbler switch and fuse. The accumulator *a* is connected as shown; *r* is a length of high-resistance wire—such as "Manganin" or "Eureka"—wound into a close spiral. For every cell to be charged about 2 ft. is used, or, approximately, 1 foot for every volt. For miniature accumulators it is safer to allow at least double this length, or employ a wire of smaller gauge. The larger bulb of the mercury tube is connected to terminal 1, and the wire, or lead, originally connected to this bulb, is joined to 8. The connections may be reversed by connecting 1 to the smaller bulb, but then the polarity of terminals 5 and 7 will also be reversed. Normally, *b* is kept in the "on" position, which short-circuits the charging board.

To put an accumulator on charge when the lamp is running, proceed as follows, strictly in order named:—Turn c to "off"; connect accumulator; turn *b* to "off"; and finally c to "on." To remove accumulator:—Turn c to "off" turn *b* to "on"; and remove accumulator. A note of this order can usefully be struck on the charging-board to obviate the lamp being inadvertently extinguished. After connection and disconnection the adjustable resistance will require slight adjustment, the current dropping a little when the accumulator is placed on charge and *vice versa*. When first connected, it, so to speak, "backfires" right round the outer circuit in direction 5, 3, 2, 1, 8; but the resistance *r* limits the rate of discharge, and prevents a dead short circuit, which would damage the accumulator, and possibly heat the connecting wires to such an extent as to frizzle the insulation. Should *c* accidentally be left in the "on" position a dead short circuit is established, and the fuse at once goes, thereby bringing the resistance into play.

If the charging rate of the accumulator is about the same, or more than the current taken by the mercury tube (3½ amps.) the foregoing arrangement suffices, and it is not necessary to remove the accumulator when the lamp is not running. If it takes less current, we must side-track, or shunt some of the current by inserting an adjustable resistance between 2 and 6. The current now divides, part flowing in direction 2, 6, 7, and part through the accumulator, whose back E.M.F. acts in the same way as if a length of high resistance wire had replaced it. The shunt resistance can be a simple helix as before, allowing at intervals straight bits to permit various lengths to be coupled up. When the lamp is not running the accumulator must be disconnected, or it will slowly discharge through the shunt. An ammeter in circuit with the accumulator is in all cases handy, and essential for midget types, but for larger, one can roughly gauge the amount of current diverted by feeling the shunt resistance, which heats owing to the passage of the current. This method is, of course, far from accurate, but it is near enough, especially if we err on the side of charging at a slightly lower rate than the normal. A simple experiment will give an indication of the heat generated in the wire by 1¾ amp. Connect 5 and 7 with copper wire, and 3 and 4, and 2 and 6, with exactly equal lengths (say one foot) of the resistance wire wound into a helix, and open both switches. Then half the current will flow in each direction, and equally heat each helix. The shunt will also be found of use with sulphated cells, when prolonged charging at a low rate is recommended.—E. A. S.



Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, April 29—May 17.

Living Photographs.—No. 7,316. Animated picture photography. S. E. Boivie.

Paper.—No. 7,641. Photographic printing paper and transfer processes. Kerotype, Limited, and T. P. Middleton.

Shutters.—No. 8,131. Light-proof shutters for photographic dark-rooms. J. C. Sellers.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each post free from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

X-Ray Sensitive Paper.—No. 114,933 (June 4, 1917).—The invention has for its object the provision of a sensitive flexible material so prepared as to admit of one, two or more copies being directly obtained with one exposure and avoiding the loss of time occupied in making an exposure on glass and then printing from the same. A sheet of paper, etc., is sensitised in any known manner, and treated with a paint or wash of venetian red, chrome yellow or other like suitable preparation which is impervious to light and is easily removable by washing, the paper being treated on both surfaces. The opaque coating forms an adequate protection to the sensitive paper, and admits of it being handled openly and dispensing with the use of light-tight envelopes, etc., the treated paper being made up in single sheets or in books, packets or blocks containing the desired number of sheets. For producing a print, the prepared sheet or two or more superimposed sheets is (or are) supported behind the object to be radiographed and may be placed in any angle to suit the object, or on any curved surface to bring the whole of the surface as near to the object as is possible to give the best results, the print being thus taken directly on the paper, which is subsequently washed to remove the opaque surface and develop the print or prints. By means of the invention, X-ray photographs can be produced with the utmost rapidity. The cost of manufacture of the sensitive paper being less than that of sensitive glass and the subsequent developing operation being minimised the production of radiograms is cheapened. George William Kilner Crosland, New North Road, Huddersfield, and Thomas Pearson Kilner Crosland, Fitzwilliam Street, Huddersfield.

Exposure Indicators.—No. 114,672 (April 16, 1917). This invention consists in a device for preventing two exposures being made upon the same film, of the type employing a spring, or gravity controlled member operating in the path of the shutter trigger. In the drawings, Figs. 1 and 2 show the construction which is preferred. A is the ordinary trigger of a hand camera, which may be worked either by the finger of the operator, or, by means of the press button B operating the trigger through the medium of the flexible cable C. E is a small cylinder provided with a movable spindle F having a collar *f*, between which and the base of the cylinder operates the spring G tending constantly to press the spindle F out of the cylinder; the outer end of the spindle F carries a plate H firmly attached to it and arranged so that it may work in and out of the groove i in the end I. As shown in fig. 1, the plate H is continued towards the camera so as to overlie the trigger A when in its outermost position, as shown by the dotted line A in fig. 2, and in this position the trigger A is prevented from taking its full stroke; if, however, the plate H is pressed back to the position shown in full lines in fig. 2, it is removed from the path of the trigger A, which can then complete its stroke, and, at the same time, it serves to prevent the spring G pushing the plate H outwards. The trigger A in this case—and in almost every case—is spring-operated, and when pressed downwards for the exposure, it returns under the action of its controlling spring, and towards the end of its travel engages the shutter apparatus so that when next pulled downwards, it operates correctly; if, however, it does not complete its stroke, it does not reach engagement with the shutter mechanism, and pulling it over from the shortened-stroke position, does not allow of its operating the shutter. In operation, therefore, the plate H serves to prevent the trigger A completing its stroke until an extra manipulation by the operator takes place, namely, the plate H must be pressed in out of the way of the trigger before it completes its stroke. If, therefore, the photographer, after an interval of time, takes his camera and finds the trigger is not in operative position, he is warned that there is a picture already on the portion of film in position for exposure and he rotates a further portion of film into position and then presses in the plate H and thereby knows that he is not giving two exposures on one portion of film, thus possibly spoiling a picture which he values. Advantageously, the plate H may be marked with a warning, say, for instance, "change film," as appears in fig. 7. Referring to figs. 3 and 4, which represent a very simple form of the invention, K is a spring having a crank which causes the turned down end *k* to be brought into the path of the trigger A when on its return stroke after being pulled down for an exposure; when found in this position, which is indicated by the middle full line position of the trigger in fig. 3, the film should be changed by the operator. The spring K is removed from the path of the trigger by pressure of the finger upon the lug *l*, the trigger then completing its stroke and being set for a further operation of the shutter, which is indicated by the top (dotted) position of the trigger in fig. 3. In figs. 5 to 8 is shown a further modification comprising an angle bracket M attached to the front

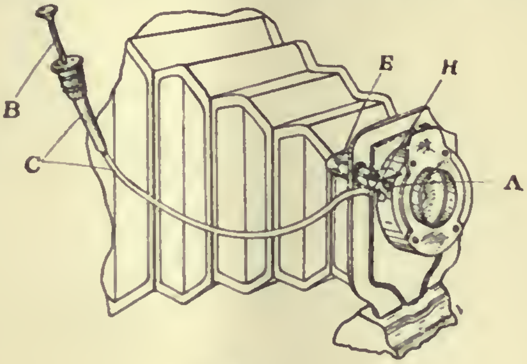


Fig. 1.

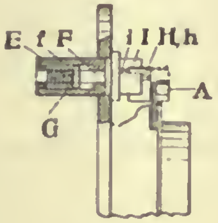


Fig. 2.

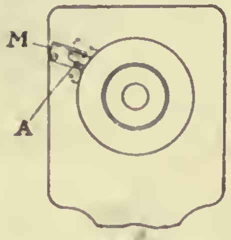
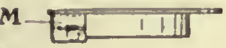


Fig. 5.

Fig. 6.



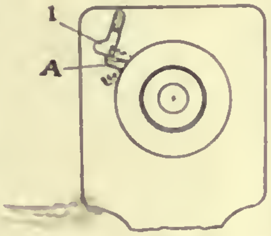


Fig. 3.

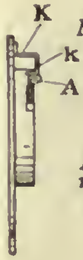


Fig. 4.

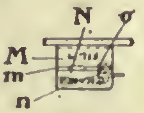


Fig. 7.

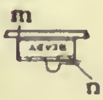


Fig. 8.

plate of the camera and connected by means of the spring hinge *m* with a second flap N. The bracket M is just clear of the trigger A, as shown in fig. 6; when, therefore, the flap N is turned against the action of the hinge *m*, over on to the face of M, as shown in fig. 8, the trigger is free to rise; on the back of N is a small non-return lug *n* at right angles to the flap N, and since the trigger A rises beyond the hinge when the flap N is turned over, the lug *n* will press against the trigger A (see fig. 8) and prevent the flap N from returning to position over the trigger by the action of the hinge *m*, as indicated by the full line representation of the trigger in Fig. 5, and will thus prevent the return of the trigger A to its final position until again raised by the photographer. *o* is a position lug for the stop, or open position of the flap N. The spring of the hinge *m* will always be of greater strength than that of the trigger A in order to ensure the holding down of the trigger. In each of the above cases, the flap may be marked with a warning or an indication that the camera is ready for action, for instance, "change film," as shown in fig. 7, when the flaps are open, and "ready," as shown in fig. 8, when the flap is closed. A. M. Oppenheimer, 31, Queen Victoria Street, E.C., for Alfred Edmund Manby, Oficina, San Lorenzo, Iquique, Chili.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Diomet.—No. 380,785. Photographic developers (chemical). White Band Manufacturing Co., Ltd., 121, Selsdon Road, South Croydon; manufacturing chemists, November 27, 1917.

REGISTRATIONS RENEWED.

Valento.—No. 265,047. By the Leto Photo Materials Company, Limited, in 1904. (Class 39.)

Celor.—No. 263,023. By C. P. Goerz in 1904. (Class 8.)

Lion Device.—No. 264,789. By the Imperial Dry Plate Company, Limited, in 1904. (Class 39.)

Lion Device.—No. 264,788. By the Imperial Dry Plate Company, Limited, in 1904. (Class 1.)

TRADE MARKS REMOVED FROM REGISTER.

In the official language of the "Trade Marks Journal" the following trade marks have been "removed from the register through non-payment of renewal fees." Such non-payment is of course the method adopted by a firm having no further occasion for the use of a mark.

Rapidol.—No. 262,319. Registered by the Rapid Photo Printing Company, Limited, in 1904. (Class 1.)

New Materials, &c.

Ensign Dry-Mounting Tissue. Made by Houghtons, Ltd. 88-89, High Holborn, London, W.C.1.

In issuing a brand of dry-mounting tissue under their trade mark of "Ensign," Messrs. Houghtons must assuredly have experienced some of the difficulties of the time in the way of obtaining materials. It is, therefore, all the more satisfactory that they should have succeeded in producing an adhesive tissue which, as our tests have shown, responds excellently to the requirements of the dry-mounting process. The tissue is one remarkably free from colour. It is of pale yellowish tint when laid on a sheet of white paper and of rather stouter substance than other makes which we have used. In using it, according to the working instructions, we found nothing to complain of in the firm adhesion of prints which it ensures. In fixing tissue to the print, it is necessary to use the fixing iron at a somewhat lower degree of heat than customary and at the same time to keep it on the tissue somewhat longer than usual. In the mounting press the temperature should be between 180 and 200 degs. F. for prints of average thickness on bromide or gaslight paper. With about the customary period of "dwell," the tissue will then unite print and mount most effectively and will be found to permit of smooth and rapid work, whilst being at the same time amenable to the needs of the amateur worker who may care to carry out dry-mounting under the rather more difficult conditions attaching to the use of a hot iron instead of a press. The tissue is supplied in gross packets in sizes from 3½ by 2½ inches to 20 by 16 inches, and in quires of 24 by 20 sheets, price 10s. per quire. In the half-plate size, the price is 4s. 4d. per gross; in whole-plate, 8s.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, June 3.
South London Photographic Society. "Kodura Paper." W. F. Slater.
Tuesday, June 4.
Sheffield Photographic Society. Annual Meeting.
Wednesday, June 5.
Edinburgh Photographic Society. Annual Meeting.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, May 28, Mr. A. J. Bull in the chair.

Mr. Cumberland Clark delivered a lecture entitled "Two years of my Life in New Zealand," illustrated with an immense number of lantern photographs of the scenic features of the North and South Islands, and dealing at length with the many attractions which New Zealand has to offer to the traveller.

The hearty thanks of the meeting were accorded to the lecturer by acclamation.

CROYDON CAMERA CLUB.

The meeting of last week acquired a peculiar distinction owing to the absence of the secretary, Mr. J. M. Sellors. To say that members were unduly perturbed would be untrue, but when it is mentioned that he happened to have the key of the refreshment department in his pocket at the time, all who know the club will understand the genuine grief felt, and, had they been present, would have sympathised with the many forcible expressions of regret uttered.

The prize and competition slides of "The Amateur Photographer" were shown, and, viewed through the depressing atmosphere of enforced teetotalism, very good many were. Mr. Keane read the narrative, and finished about twenty slides ahead of the lanternist (Mr. Reynolds), who, in a plucky attempt to keep abreast, inserted the slides in the carrier in every conceivable position except edgeways towards the screen. This out-of-step business led to some remarkable titles being given to the pictures, perhaps the choicest example being "Deadly Nightshade" applied to a pleasing portrait of a young lady.

Towards 9.30 p.m. some genius suggested a short adjournment "across the road," and faces brightened. The office boy was sent to reconnoitre, and soon returned, looking white about the gills, with the disastrous news "sold out, and shut up." It is only fair to the dry-ginger section to add that not a ghost of a smile was to be seen on any countenance. Had a suspicion of one appeared it is safe to say it would never have reached maturity. Ultimately a most cordial vote of censure was accorded Messrs. Keane and Reynolds, and the proceedings terminated in profound gloom, which a gala thunderstorm outside only served to emphasise. A black Wednesday indeed.

South London Photographic Society.—At the meeting held on May 22, Mr. E. W. Brooks gave a demonstration of the branch of indoor work which commonly goes by the name of table-top photography, and consists in the construction of miniature subjects for the camera from home-made figures and from simple materials which can be used as the means of forming realistic backgrounds. The demonstration served to show the opportunities for entertainment which the use of these materials in conjunction with the camera readily affords.

Commercial & Legal Intelligence.

Legal Notices.—Notice is given that at the expiration of three months from May 24 the names of the Acme Tone Engraving Co., Limited, and Fine Art Securities Corporation, Limited, will, unless cause is shown to the contrary, be struck off the Register of Joint Stock Companies, and the companies will be dissolved.

News and Notes.

Canadian Blanc Fixe.—A chemical company has been incorporated, with head office at Kingston, Ontario, with an Ontario charter, and an authorised capital of 100,000 dollars. The object of this company is to do general manufacturing chemical business, making a specialty of barium compounds, principally blanc fixe (artificial sulphate of barium). United Kingdom firms interested in this matter may obtain the name and address of the company referred to on application to the Department of Overseas Trade (Development and Intelligence), 73, Basinghall Street, London, E.C.2. In making application the reference number (140) should be quoted.

Second-hand Apparatus.—Messrs. Watsons, 84, High Street, Sheffield, send us a closely printed 48-page list of second-hand cameras, lenses, enlargers, etc., included among their stocks. Now that so many buyers require to look to the second-hand firms for their supplies, a list such as this is of more than ordinary interest. Glancing through its pages, we notice that Messrs. Watsons are able to offer a very large variety of all types of hand and stand cameras for plates and film including a very great number of the vest-pocket size. The lens section is likewise a comprehensive list of anastigmat, R.R., and casket lenses, such as can be studied with profit by those wishing to add to their optical equipment. A price-list which is able to include so many hundreds of items must necessarily represent stock of the largest order, and we can understand that photographers will be anxious to obtain a copy of it, as they can by application to Messrs. Watsons.

Photographic Enamels.—The "Yorkshire Observer" reports that Mr. Lewis Crabtree, formerly of Oxenhope, Yorks, has perfected a process for photographing on china, glass and enamelled metals which promises to introduce into numerous fields of commercial enterprise an entirely new and striking feature.

Amongst the many purposes to which Mr. Crabtree's invention may be applied are the following :—Portraiture, china decoration, art reproduction, advertising, stained-glass windows, and artistic wall-surface decoration on tiles and panels. The interests controlling these various departments of enterprise have already been approached, and orders have been received for large quantities of work. The British rights of Mr. Crabtree's invention have been purchased by a London syndicate, and a private company has been formed with a capital of £25,000 for the purpose of organising business in the British Isles. The name of this company is "The Farquhar Vitrified Photograph Company, Ltd.," whose offices and works are situated at East Sheen, London, S.W.14. Mr. Crabtree has been appointed director and general manager of the company, and Mr. Robert Farquhar Gribbin, formerly of Shipley, is managing director.

Tribunal Appeals.—At the Coventry Appeal Tribunal last week the adjourned application for the review of the exemption given to George Redding (38), photographer, 29, High Street, was heard. —Mr. Eaden explained, that, as the result of a re-examination, his client had been classified Grade 1. In August last he was granted a munition substitution order; but, despite frequent efforts on his part, he had been unable to obtain work, and he had accordingly continued in his business, in the purchase of the goodwill of which and the premises he had sunk nearly all his capital. His business was largely patronised by soldiers, and he had photographed nearly everybody, from Lieut.-Colonel Johnstone to the office boy. Photography was not included as a luxury trade, and he asked for a reasonable exemption to enable Mr. Redding to make an effort either to get someone to carry on or to buy the business.—The Chairman pointed out that they would shortly be adjudicating in the cases of older men, and if they allowed this man to remain they would have to accept a lower standard of hardship for the older men.—Mr. Eaden asked for 56 days to try to clear things up.—The Chairman : That is reasonable, and we have no objection to that.—Mr. Meredith thought Mr. Redding could congratulate himself on the fact that he had remained out of the Army so long. His view was that photographers would be better employed photographing German positions than in photographing English officers and recruiting staffs. The reason that photographers did not appear in the schedule of April 9 was that it was never imagined that any A men were left in the photographic trade.

At the Sussex Appeal Tribunal, the application of a Chichester photographer, forty-one, married, and classed as Grade 2, was heard. It was claimed that applicant's one-man business would be ruined if he were called up, but the decision of the local tribunal granting three months' exemption (final) was upheld. Three months were allowed a Littlehampton photographer and stationer, twenty-eight, single (Grade 3), who supports his father.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

W. R.—So far as we know there is no firm in the photographic trade which supplies waterproof felt. We should think your best course would be to look up dealers in builders' materials in the Glasgow directory, where most probably you would be able to come across a firm from whom you could buy.

Permanence.—Could you please tell us if bromide prints (B. and W.) can be considered permanent?—M. and M.

Broadly, yes: they are permanent, in the sense that they ought to last for twenty or thirty years without material change. We may refer you to the article on this subject in the "B.J." of February 15 last.

Business Registration.—1. Trading in my own name is it necessary to register? 2. The work being done at my private address I presume it is unnecessary to have a sign board fixed unless I so desire?—Cousin Jack.

1. If you use the full name by which you are customarily known, with nothing added to it such as "and Co.," it is not necessary to register. 2. No necessity to display a sign.

A. L. B.—Many of the machine printers are sold in models for use with an oil lamp. We know you can use the machine of G. S. Moore for oil, and so you can the "Renaud" of Marion's and the "Hana" of Houghton's. We think also you can the "Klimax" of Butcher's, although none of the oil models are quite so convenient in use as those for gas, and still less so those for electric current. Apart from the facility of dealing with dense negatives and slow papers, the results with oil are equally as good as those with any other light. Probably you would find it best to get a good high-power lamp, and when necessary damp it down with one or more screens of ground-glass if exposures are found to be inconveniently short.

M. J. K.—We have known markings of the kind exhibited in your negatives to have been caused by vigorous rocking of a plate during development. Possibly this suggestion may contain some hint, although it is certainly a very uncommon cause. Perhaps a more likely one is that the marking is due to irregularity in drying the negative. Do you dry negatives in a rack, and is the rack wet when negatives are put into it, or much wetted by water adhering to them? In these circumstances it is possible that the slower drying near the edge of the plate may be the cause of the slight marking. You might easily make it a practice for a while of drying negatives by some such means as supporting them one corner downwards between a couple of nails on a board so that there can be no chance of the edges being kept moist after the other parts have dried.

J. S.—In your circumstances the usual course is to colour a black print, if necessary one which is made rather pale. Some photographers have used the Satista silver-platinum paper for such work, bleaching out the silver image with ordinary Farmer's reducer, and then carrying out the colouring on the faint platinum image which remains. Except by painting the portions to remain black with a "resist" such as a little rubber solution there is no method of toning prints so that any desired portions remain of black tone. Double-toning of this kind is done by various means, but we should not think that it would be of service for artistic purposes such as you have in view. Almost inevitably there is a sharp outline which shows which part has been toned. You might, of course, mask this in the after-colouring, but we should think the pale black print is the most satisfactory method.

H. Bros.—We have not heard from any of our readers complaining of such fluctuations of electric supply. Apparently it has not been encountered in the case of the larger electrical companies. We should certainly think that accumulator batteries would be quite satisfactory for running printing lamps, though we should wish to be guaranteed beforehand whether they would work satisfactorily with a mercury-vapour enlarging outfit. If the current is delivered at a lower voltage you will probably find that there is economy in consumption, though of course this would mean outlay on fresh lamps, and in any event it is not likely that the lesser consumption of current would in any way equalise the cost of the battery. We are sorry that we have no information on a reasonable cost for batteries of this kind and suggest that you might check the quotation of your electrical company by getting one from a large electrical concern such as the General Electric Company, 67, Queen Victoria Street, E.C.

Copper Intensifier.—In a recent article on intensifiers, mention was made by the authors of the copper intensifier of Callier for negatives of line subjects. I should be very much obliged if you could tell me what this formula is, or refer me to any text-book which contains it. Is it anything different from the copper intensifier as regularly used in the photo-engraving trade?—F. T. Manton.

It is a variation of the regular process. The negative is bleached in a solution of copper bromide made by dissolving ½ oz. each of copper sulphate and potass bromide in 20 ozs of water. It is then passed through three or four baths of 1 :50 acetic acid, remaining in each for about five minutes. The last bath when tested by pouring a little of it into a measure and adding ammonia should show only a slight blue colour. The negative is then given a soak in distilled water and darkened in a bath of silver nitrate, ¼ oz.; water 12 ozs. After a further short washing in distilled water it is given a weak bath of common salt and may then be washed and dried. If preferred it may further be passed through a 10 per cent. solution of sodium sulphite and afterwards re-developed, preferably with amidol. This supplementary process converts any residual silver chloride into silver.

W. F. B.—About the best blackening preparation for metal sheaths is made as follows :—Mix the strongest solution of celluloid in amyl acetate (that is, strongest celluloid varnish) with enough artists' lampblack to form a black paste, and then add enough acetone in order to get a matt deposit when the mixture is brushed on the metal. It may be necessary, if you do not add enough at the start, to add some more of the lampblack. This will give you a coating which is not readily chipped off, although no matt black is perfect in this respect.

While we give you this formula, we would say that we cannot see why you should need it. If the plates are backed the slight metal sheen of the sheath will have no effect in causing halation; and if the plates are not backed, no blacking of the metal sheath will prevent halation, which is due, to some extent, to reflection of light within the emulsion coating and also to reflection from the back surface of the glass plate. Therefore, reflection from the metal sheath would be of very minor effect in causing halation. The writer has used sheaths of this kind for many years in a reflex camera, employing both backed and unbacked plates, and has never found any necessity to have them blacked.

H. C.—The orthochromatic quality of the anti-screen plate is certainly some advantage in ordinary work, and, at any rate, no disadvantage. But if you want a pronounced degree of correct colour rendering, you need to use a colour screen. 2. If you develop plates by inspection in a dish you require to wash the backing off before development, but if you develop by time, in a tank, it is better to keep it on. 3. There is nothing much that can be done to the negatives by way of retouching. We should try what results you can get from them with a good contrasty gaslight paper. We cannot see that it would be any use sending them to a retoucher. They have the look of having been exposed fairly correctly, but developed in a solution which has produced more chemical fog than it should, and that, no doubt, is the reason why you have taken them out of the developer before they were developed enough. If we were you, we should try results with some of the plates, using a developer made up from tabloids, when probably you will find that the fault lies simply in the developer.

M-Q. Developer.—A practical difficulty is constantly arising and your help will be appreciated :—The following solution is made: Metol Johnsons, 220 grs., Quinol, 440 grs., dissolved together; Soda Sulphite, 8 ozs., added afterwards; water to 80 ozs. (Soda carbonate is kept in a separate solution). Discolouration sets in immediately the two reducing agents are dissolved. It is *slightly* removed by the addition of the sulphite but gradually re-appears and long before the solution is used up it becomes a deep brown colour. On the other hand if the preservative is dissolved first the metol will not dissolve properly. Perhaps you have some suggestions to make? My mind has been running along the lines of your "acid sulphite" and wondering how it could be incorporated in the developer and whether it would be an advantage. —E. A. W.

Perhaps the quality of the water has something to do with it. Try boiling for 5 minutes and putting aside quietly until nearly cold before using. You might also dissolve in the order :—metol, sulphite, quinol, though we do not know that it would be a preventive of the discolouration. So far as our experience has gone the sulphite-metabisulphite mixture is without special preservative effect on developers other than pyro and amidol.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
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12 words or less	1/-
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(No reduction for a series.)

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If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH
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SUMMARY.

From America comes news of a circular issued in Berlin last October by the Association of German Amateur Photographers' Societies, calling upon Germans to boycott certain classes of American-made photographic products, and to abstain from the use of the word Kodak on account of the benefit conferred by its employment upon the "American-English" Kodak Company, by which the war loans of the Entente nations have been so largely subscribed to. (P. 263.)

An interesting collection of portraits by Mr. Malcolm Arbuthnot is on view during the present month at the Camera Club, 17, John Street, Adelphi, London, W.C. (P. 260.)

The exhibition of the Royal Photographic Society will be held from October 13 to November 30 next. (P. 257.)

A very weak solution of Seccotine may be used for giving a slight stiffening to chiffon or other material used in draping the figure for bust portraits. (P. 258.)

The formation of a society of Lancashire photographers, to be affiliated to the Professional Photographers' Association, is announced. (P. 262.)

Extravagant claims by customers in respect of originals which may have been damaged whilst in the photographer's care need not cause any apprehension, the law not recognising what is commonly termed "sentimental damage." (P. 258.)

The lettering and design on regimental buttons will come out very much better in a photograph if the buttons be first given a light rub over with a piece of soft putty. (P. 259.)

A few of the chief causes which enter into the making of bromide prints of inferior quality are the subject of an article on page 258.

Details of construction of a rotary print-drier are given in a recent patent specification. (P. 250.)

Printing the negative by diffused light whilst keeping it constantly in motion is a means of obviating the defect which may occur through a fault in the glass. (P. 259.)

Slatish blue stains on prints toned with hypo-alum are due, we believe, to patches of silver compounds left in the film through incomplete fixation. (P. 258.)

"Colour Photography" Supplement.

Illustrated diagrams of the stages in the manufacture of a recessed colour-screen film invented by M. L. Dufay have been published by the "Scientific American Supplement." (P. 21.)

The first colour photography of war scenes and incidents to be publicly shown is now the subject of lantern exhibitions at the Grafton Galleries, where Mr. F. Hurley's many fine transparencies by the Paget process are being shown. (P. 24.)

Some of the more common pitfalls in the working of the Autochrome plates are the subject of an article. (P. 22.)

The current instalment of "Decennia Practica" deals with the processes for the manufacture of colour-screen plates patented by R. Krayn, J. H. Powrie, R. Ruth, and Dr. J. H. Smith. (P. 23.)

EX CATHEDRA.

R.P.S. Exhibition. It is just announced by the Council of the Royal Photographic Society that the annual exhibition will again be held at the Society's house, where it will be open free to the public. The period fixed for the exhibition is from October 14 to November 30, and, as was the case last year, lectures will be delivered on certain evenings in each week during the time which the exhibition remains open. The latest date for receiving entries delivered by carrier is Friday, September 20; those delivered by hand may arrive on Saturday, September 21. Unless prints can be delivered and collected again by hand they should be sent unframed, but, of course, mounted. It is stated that a flat entrance fee of 2s. 6d. will be charged on all entries, and that this sum should accompany the entry form. Prospectuses of the exhibition will be ready about the middle of July, and application should be made for them between now and then to the Secretary, Mr. J. McIntosh, 35, Russell Square, London, W.C.1.

* * *

Marginal Fog. It sometimes happens that the excessive taking of precautions is the cause of defects in negatives which would never have occurred at all to a more happy-go-lucky worker. We had an instance of this the other day in some negatives which were shown to us with the suggestion that they were due to stale plates as evidenced by the narrow band of fog along the edges. We did not agree, because in the first place the fog had not the dichroic appearance which is usually associated with staleness of the emulsion, and in the second place it occurred only on two sides of the plate. While it is admittedly possible that the packing of plates may be such that they suffer on two edges only, it is rare for this to be the case, and we sought other causes for the phenomenon. We found it in our friend's camera, a heavily built landscape instrument with the back frame of rather more than ordinary thickness. A glance at the interior showed that the portions of this back frame adjacent to the plate, when the latter was exposed to the lens, were about as shiny as they well could be. Inquiry showed that it was this worker's practice to rub the entire inner woodwork of the camera with a duster before taking it out for use, with the result that what originally was a dead black surface had been rubbed up to quite a respectable polish, and one which, according to the subject, was capable of reflecting a narrow band of light upon the edge of the plate. Reflections from the inner woodwork of a camera are responsible for more markings on plates than many perhaps realise; and one of the things which may well be done every few months is to touch over wood or metal surfaces which can possibly come within the field of the lens with a little dead black.

A Drapery Hint. It is often found that the chiffon, ninon, or tulle used for draping bust portraits loses its "dress" and becomes very difficult to handle, failing to retain its folds, and very easily slipping off the shoulders. This state of things may easily be remedied by redressing the material with a very weak solution of Seccotine, or even clarified fish glue. Those whose only experience of Seccotine is in using it as an adhesive will be inclined to think that there must be some stickiness about material so treated, but we are assured by a photographer who has tried it that it gives just the requisite stiffening, and leaves the surface smooth and dry. All that has to be done is to make a solution of about a teaspoonful of Seccotine in a quart or more of warm water, and to immerse the material to be dressed in it. The excess must be squeezed out, and while the fabric is just damp it is ironed with rather a cool iron. A trial will show whether the desired degree of stiffness is reached. If not, the fabric may be re-dipped in a stronger or weaker solution as may be found necessary. It is, perhaps, hardly necessary to point out that if it be desired to darken white or pale blue material to a cream tint this may be done simultaneously with the dressing by adding a little dye or even coffee to the solution.

* * *

Stain which Tones. We continue every now and again to receive prints and postcards showing stained patches of a slaty-blue colour, the cause of which as a rule our correspondents imagine to lie in the hypo-alum toning process. The toning bath, however, is not really at fault, but, by its toning action, is merely disclosing a fault which existed latent in the print. While opinions may differ, our own, which is based upon a very large number of different cases, is that these slate-blue stains arise from imperfect fixation of the original prints. In some instances the bluish patches have straight sides, indicating that incomplete fixation has been brought about by one print lying upon another in the fixing bath. However it may be caused, it is pretty clear that there are left in the print patches of silver compound which are tonable in the hypo-alum bath and do tone in that bath, often yielding a deposit of very considerable intensity. As we have several times pointed out, the preventive is in a photographer's own hands. If prints are passed through two fixing baths in succession it will almost invariably be found that the occurrence of these stains ceases altogether. It is, of course, necessary that the two baths, and particularly the second, should be maintained in active working condition. As a matter of practice it is a good plan to discard No. 1 as soon as it has reasonably done its work, to replace it by No. 2, and to pour out a fresh lot for the second bath.

* * *

Customers' Damaged Originals. The photographer who has the misfortune to damage some glass positive or Daguerreotype placed in his hands for copying usually finds, as his first subsequent experience, that the customer sets an extraordinarily high value upon it. In ninety-nine cases out of a hundred the value is wholly a sentimental one: the original is the portrait, and often the only portrait, of a bygone member of the family which cannot be replaced. While there should be every sympathy with this aspect of the case, there is no need to be alarmed by the customer's declaration of the large sum which he intends to claim by way of compensation. On the contrary, there is good reason to encourage the customer to put such a claim in writing, for the reason that the very act of his doing so places him in a very awkward position should he subsequently decide to take legal proceedings. In these matters the law does not recognise sentimental value, and a County Court judge in awarding damages has only to be guided by the amount which the original cost at the time it was made or a sum for which as close a replica of it as possible can be produced at the present time. Therefore a customer who, in ignorance of this legal view, makes an exorbitant claim involves himself in difficulties, since he will find it no easy matter to show that a positive which in the 'sixties or 'seventies could be made for a few shillings now has a value of twenty, thirty, or forty pounds. When it can be shown that a case has been weakened in advance by an excessive claim, it is often an easier matter to adjust a dispute in a more or less friendly fashion without taking it into court.

BAD BROMIDES.

Nearly all photographers make bromide prints; a minority make good ones; more make passable ones; and the remainder make poor ones. The worst of it is that those who make the poor ones do not realise how poor they are. One of the greatest factors in the production of bad bromides is the idea that a thin negative is necessary, a thing which has become such an obsession with some workers that they go on making thin negatives and then seek for "contrasty" paper to print them on. This is quite an unsound way of working, for any paper which produces a print in a different scale of tones from the negative is not so likely to give an accurate rendering of the tones of the original subject. Some sort of a print may be made from almost any kind of negative on bromide paper, but a good plucky but not over-dense negative which will give a good platinum or carbon print will give the best class of print in bromide. Two points necessary to be observed whatever class of negative is being used, are correct exposure and full development. These ensure a bright print of good colour which will give a satisfactory sepia with either sulphide or hypo-alum toning. The usual practice of bromide printers in portrait studios is to give a long exposure and then to develop for a very short time, often hardly relinquishing their hold of the paper while it is in the solution. Thence it is transferred without rinsing to the fixing-bath. Such prints are usually lacking in brilliancy, instead of being a pure black they usually have a rusty tint, and if toned yield the "ginger" hue which disgraces so many show cases. To ensure correct exposure it is only necessary to make a few test strip exposures ranging, say, from two to thirty-two seconds, from three or four typical negatives and to develop these fully out, or at all events for a fixed time, say two or three minutes. It will then be easy to discover from the strips the correct exposure for each class and to note it on these typical negatives, also noting the exact distance between the light and the printing frame. There are many self-satisfied printers who would be quite surprised in the improvement in the quality of their output if they would but work on this system.

Except for very thin negatives it is best to omit bromide of potassium from the amidol developer, which is, in our opinion, the best one for bromide work. M.Q. has the advantage of durability and it also avoids stained fingers, but it does not yield the pure blacks and greys given by amidol, and prints developed with it do not tone to such good colours as amidol-developed ones do. The greater lasting power of metol-hydroquinone is in itself a danger, for there is always a risk of using it with occasional strengthening long after it has absorbed an undesirable quantity of bromide from the prints previously made in it. This is indicated by the hardness and greenish colour of the prints. Amidol becomes exhausted more quickly and at this stage gives poor rusty-coloured prints. Different samples vary considerably in their developing power, so that it is impossible to say how many prints a given weight of the salt should develop properly. It is false economy to overwork the developer especially at the present price of bromide paper. Except when it is necessary to stop development instantaneously, prints should always be rinsed before fixing. Amateurs and those who only develop a few prints occasionally may perhaps disregard this precaution, but when a large number of prints is made daily and the bath not renewed very frequently there comes a time when the character of the fixer is changed, and muddy-looking prints result. There is no grey fog such as is caused by exposure to light, but the whites have a dingy tint which is best described by comparing them with the white of an egg which has not quite reached the election stage.

Although pyro-soda has been occasionally mentioned as available for the development of bromides, there is one point which has not yet been fully appreciated, and that is its power of producing vigorous prints on ordinary paper from flat, thin negatives. Any ordinary formula may be used, but should contain at least 40 grains of sulphite per ounce of mixed solution. A convenient way of adding the extra sulphite is by diluting the concentrated solutions with a 5 per cent. solution of sulphite of soda instead of using plain water. Toning troubles are few with properly made prints, but there is one which must be specially guarded against—namely, imperfect washing before bleaching. A slight trace will cause a general reduction of the image, while uneven washing, leaving a considerable quantity of hypo in places where prints have hung together, results in a patchy appearance, some parts almost disappearing, while others tone to a good colour. Weak sulphide solution is another common cause of bad tones. It has been stated that, given sufficient time to act, a weak solution will answer as well as a stronger one, but that has not been our experience. We have found that even with quite weak prints a good brown tone, not orange, can be obtained with a solution made as strong as the paper will stand without blistering. Of course, there is no accession of strength, but the colour is good: on the other hand, a weak solution gives a poor colour to even a vigorous print. With regard to the bleaching, we have found the best tones to be obtained by a bleacher which worked rather slowly, taking, say, five minutes to bleach a fairly strong print.

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Manchester Amateur Photographic Society.—Examples of photography of high quality by some of the women workers of the country are being shown at the rooms of the M.A.P.S., Carr Street, Manchester. The exhibition was opened on Tuesday evening, May 28, by the President, Mr. F. G. Curson. The Secretary, Mr. Walter Johnson, states that it will remain open to those in Manchester and district who are interested in photography on Tuesdays, June 4 and 11, 7 p.m. to 9 p.m., or for parties by appointment, any evening during the same hours, by applying to the Secretary, 30, Hartingdon Road, Chorlton-cum-Hardy, Manchester.

Following the President's opening remarks, Miss Annie Dixon, one of the members, gave a most interesting paper on "Women's Work in the Scientific and Photographic World," in which she most ably proved the "gentle sex" was capable of competing successfully with the opposite sex, confirming her point by reference to the beautiful exhibits on the walls by Mania Pearson, Mrs. Cottam, Agnes B. Warburg, Margaret Venables, and Mrs. G. A. Barton.

The versatility both of subjects and treatment were admirable, and should prove a great stimulant, not only to the lady members, but to the male portion of the Society, and to all who have the good fortune to see them.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Defective Glass in Negatives.

At the present time, when under war conditions glass for photographic dry plates is very difficult to obtain, we frequently come across plates, the glass of which is imperfect, even among first-class makers' productions. Every plate, however, should be examined as well as circumstances will allow, with a view to finding out any defects; but it may be the case that occasionally an imperfect plate is exposed, and this fact not discovered until the negative has been developed and fixed. I recently had an experience of this in my own work, and as, of course, must always happen, a flaw in the glass of the plate came right across the face of the sitter. It was at once seen that it was useless to try and remedy this by the ordinary retouching methods, and so another plan had to be adopted. The prints were required to be on P.O.P., and the negative was placed in the printing-frame, and two pieces of white tissue-paper were fastened with Seccotine over the frame in order to diffuse the light. Four screw eyes were then fixed into the corners of the frame, and into each of these was fastened a short length of thin wire. The free ends of the four pieces of wire were then fastened together, and the frame hung up by this and kept revolving during the whole of the time occupied in printing. I found that when printing was complete the defect was hardly registered upon the face of the sitter at all, and a very slight spotting removed it altogether. This plan is also suitable for bromide printing, provided the exposure is made with a weaker illuminant. The above note is penned in the hope that it may be of some assistance to other workers, for though defective plates are happily not an everyday occurrence, they are to be met with; and, of course, according to the law of contraries, the defect will always show itself where it is least wanted, and the above offers a simple, and effective means of overcoming the difficulty.—Expert.

Regimental Buttons.

At the present time the number of men in khaki who come to be photographed form a very large proportion of the sitters. The men are doubtless proud of their uniform and many look very smart. The operator notices that they take a great pride in polishing their buttons and badges, especially the one on the cap. These look very showy, but the shine on them makes them come out very badly in the photograph, and under some conditions of lighting one cannot tell in the finished portrait what regiment a man belongs to. This can easily be overcome by keeping in the studio a piece of soft glazier's white putty, not too sticky, but just pliable. This is rolled in a ball and the badges and buttons, etc., are just gently dabbed with it. It gives just for the moment a nice frosted-glass appearance which photographs splendidly, and the resulting picture is sure to please, showing the badges quite clear and full of fine detail. A little rub of the duster over the badges, etc., before the sitter leaves removes all traces of the putty, and the whole operation takes up only a few minutes extra time and makes a vast difference to the results.—E.H.

Repairing Blisters in Enlargements.

Bromide enlargements are sometimes discarded owing to the occurrence of blisters either before or after mounting or which have developed after heat has been applied in dry-mounting, but the following is a remedy which has repeatedly been found very effective.

With a soft pencil mark very faintly round the edge of the blister, and then with a sharp knife cut just deep enough to go cleanly through the film, following the mark of the pencil, but not completely round to the starting point. Just enough of the disc of film should be left unsevered to allow of the film remaining attached to the print. A very sharp knife is necessary to ensure a clean cut, for it must be remembered that the film has to be laid down again in exact juxtaposition.

The disc of film having been turned back, laying bare the paper below, this latter is moistened with a little clean uncoloured adhesive (such as artists' gum water as used for mixing with spotting colours), and the cut-out piece of film is laid down again and pressed firmly into contact with a piece of blotting-paper.

Sometimes with small blisters it is necessary only to moisten the loose piece of film with water in order to obtain good contact on pressing it down again.

If the blister has not been cut to the edge, or rather to the extent of the air-space between the paper and the film, the gum must be inserted underneath with the brush.

When thoroughly dry the spot should be cleaned with pumice powder, and if the film overlaps it should be knifed down.—Geo. Coleman.

Exhibitions.

PORTRAITS BY MR. MALCOLM ARBUTHNOT.

During the present month a collection of some sixty portraits by Mr. Malcolm Arbuthnot is being shown in the lounge of the Camera Club, 17, John Street, Adelphi, where it provides the opportunity for studying the work of a man whose contributions to the pictorial side of photography have always been interesting. In looking at these portraits it is curious to be reminded that Mr. Arbuthnot, in the days when he entered pictorial photography with landscape as his theme, was noted for his love of the bizarre. It is clear that after some years as a professional portraitist he still retains his fondness for the exceptional and the striking in the way of portraiture, and possesses a mastery of his craft which prevents his most unconventional efforts from ever looking ridiculous. Nevertheless, when one studies carefully in succession the sixty portraits which are here displayed, one perceives that his greatest successes are those in which the striving after an unconventional effect has been laid aside. The work which here shows him at his best is that which is conceived in the least challenging spirit, and is represented by such examples as the portrait of the late Sir George Alexander, or that of the youthful son of Madame de Navarro (Miss Mary Anderson). Although the majority of the portraits are those of women, we cannot help feeling that those most artistically satisfying are to be found among the portraits of men. Where women are his subjects, and particularly when they are prominent members of the theatrical profession, Mr. Arbuthnot seems to feel it due to him that he should introduce an element of sensation, or at any rate should achieve something, in the way of pose or motive, beyond what would be expected in a portrait where the main consideration was a faithful likeness. While this is the impression one gathers from these photographs, it is fair to say that in many of the quieter essays, the subjects of which are women members of the aristocracy, his work attains a firm dignity and strength which mark him as a true artist, and not merely a seeker after something which will hit people in the eye. Every professional photographer can well spend part of an hour in studying these pictures, and the exercise is one which will thoroughly repay them for the trouble of securing the privilege—which is simply that of writing to the secretary of the Camera Club for a card of admission.

Permits for Posting Photographs.—As from May 27 a War Office permit is required for posting to any prisoner of war abroad photographs (except unmounted family photographs), picture postcards, pictorial representations, plans, and stamp collections; or to any person (except a person serving with the British forces in the field) in any neutral European country, or in Russia, Roumania, or Greece, or in any island off the West Coast of Africa. The articles named may be posted in the ordinary way for any other destination abroad, including any person serving with the British Forces in any country. Trade circulars and catalogues may be posted as usual for any destination abroad, as may printed matter of any other kind, to a person serving with the British Forces (not a prisoner of war), or to anyone in a British Dominion, Colony, or Protectorate, but not to any other destination abroad, save by a holder of a War Office permit. Applications for permits are to be made to the Chief Postal Censor (M.I., 9 D), Strand House, Carey Street, London, W.C.2.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications for Patents, May 21 to 25.

Mounting Lenses. No. 8,608. Method of mounting lenses. C. and H. C. Beck.

Development.—No. 8,420. Apparatus for developing photographic negatives. E. J. Sweetland.

Cinematography.—No. 8,360-1. Cinematograph films and projectors. J. E. Thornton.

Cameras.—No. 8,520. Motor-driven cameras. C. M. Williamson.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Exposure Meters.—No. 114,458. (March 27, 1917). The invention consists in a type of exposure-meter serving for comparison of the light prevailing at the time of the exposure with that of a small electric lamp contained within the meter. The chief element of novelty in the apparatus is the system of shutters by which the illumination produced on the comparator portion of the meter, from either the outside light or the interior lamp, can be reduced and the meter thus enabled to deal with a very wide range of external light-intensities. Clayton Laing, 450, Wrightwood Avenue, Chicago, U.S.A.

Rotary Print-Dryers. No. 115,348 (August 3, 1917). The main object of the invention is to increase the output of a rotary type of print-dryer by causing the wet prints to travel first over the hottest part of the dryer.

In the drawing a metal drum 5 heated in any suitable manner as for instance by a Bunsen burner (not shown) is disposed within the drum. A gas pipe 6, is connected to the burner, and a valve 7, controls the flow of gas through the pipe 6 to the burner. A series of end openings 8, are formed in the drum and the air supply to the burner passes through these openings.

The drum 5, is disposed horizontally in a suppporting frame *a* which has an intermediately disposed lateral extension formed by the projecting end portions of a pair of oppositely disposed rails 10—10. The drum 5, is rotatively mounted on bearings 9—9, which are secured to the rails 10—10, the bearings being so disposed that the drum is supported with its axis parallel with the axis of a roll 11, carried by the lateral extension of the frame *a*. The gas pipe 6, passes through one of the rails 10, and through one of the bearings 9, and the burner may be supported by one or both of the bearings.

The print carrier consists of a pair of endless belts superimposed one upon the other—that is, an outer belt 12 and an inner belt 13. These belts are formed of absorbent material and conform in width substantially to the length of drum 5, around which they are disposed. A roll 14, the opposite ends of whose shaft 15, are journaled in the uprights 16—16 at the front of supporting frame *a*, is disposed a trifle above a point in horizontal alinement with the axes of drum 5, and roll 11, and a second roll 17, the ends of whose shaft 18 are journaled in the uprights 16—16, is disposed in the alinement with roll 14, and a trifle below a point in horizontal alinement with the axes of drum 5 and roll 11.

The belts 12 and 13 pass under roll 14 and over roll 17 whereby these rolls cause the belts 12 and 13 to cover all except a relatively small segment of the side wall of the drum. This is of importance in that when the drum rotates and the belts move therewith a maximum of belt surface is exposed to the heat of the drum. From roll 14 the belt 12 passes upwardly and over a roll 19 the ends of whose shaft 20 are journaled in the upper end portions of the uprights 16—16, but the belt 13 is directed horizontally and outwardly over roll 11.

This disposition of the belts provides an entrance through which the prints can be directed and further adapts the outwardly extending portion of belt 13 to act as a support on which the prints can be arranged preparatory to their entering between the belts. From rolls 17 the belts 12 and 13 are directed inwardlly then over and under roll 21 which is arranged adjacent to roll 17 and in vertical alinement therewith. From roll 21 the belts 12 and 13 are directed upwardly and over roll 22, which is in horizontal alinement with roll 21 and supported by bracket arms one of which is indicated by 23. From roll 22 belt 13 extends to roll 11, but belt 12 is directed downwardly and over roll 22. This disposition of the belts 12 and 13 causes the belts to separate at the roll 22, and it will be noted that the line of separation of the belts is disposed outwardly and beyond the uprights 16—16, and in alinement with a receptacle 24, which is removably secured to a support formed by the end portions of the lower rails 25—25, which project beyond the uprights 16—16.

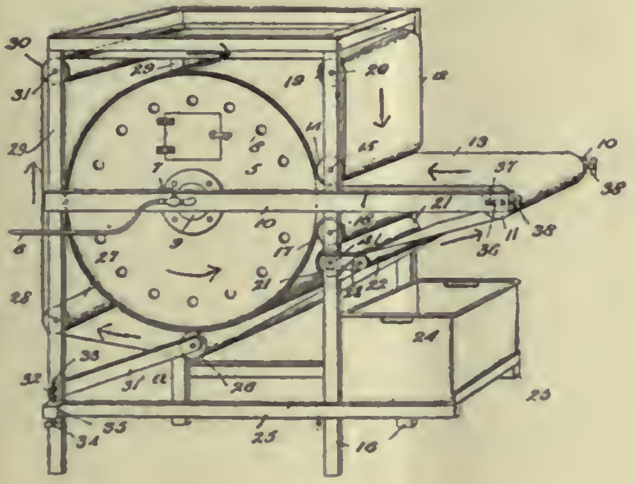

Fig. 1.

From roll 22 belt 12 is directed downwardly and under roll 26 then rearwardly and under roll 27 the ends of whose shaft 28 are journaled in the rear uprights 29—29 of support a then upwardly and over roll 30, the ends of whose shaft 31 are journaled in the upper end portions of uprights 29, then forwardly to roll 19. Roll 26 is supported by a pair of arms, one of which is indicated by 31^1. These arms are adapted to be turned and thereby cause the roll to move bodily to vary the tension on belt 12 whenever found necessary. The arm shown is provided at its outer end portion with a laterally extending head 32 arranged so as to slide in a slot 33 into upright 29. A thumb screw 34 passes through a threaded opening in a lateral lug 35 and screws into the head 32.

Obviously with this construction when the thumb screw 34 is turned in one direction the roll 26 is depressed and belt 12 thereby tightened. A belt adjuster is also provided for belt 13. In the present instance roll 11 carries at its ends heads, one of which is shown and indicated by 36. These heads are adapted to slide in slot 37 in the rails 10. Thumb screws 38 screw into openings in the ends of the rail 10, which also screw into openings in the heads 36, so that by turning the screws 38, the distance between the roll 11 and the drum 5, is varied.

The several rolls previously described are constructed so as to prevent skewing of the belts 12 and 13. This is most necessary in a device of this kind where prints of different sizes are frequently operated upon simultaneously. In such instances certain sections of the belts become more wet than others, and this uneven wetting results in the relatively wet portions stretching to a greater extent while the belt is in motion than the dryer portions so that unless provision is made to compensate for this uneven stretching the belts will creep laterally on the rolls. With the construction shown in Fig. 2 it will be observed that creeping is prevented by reason of the threaded portions 39—39 at the opposite end portions shown in the roll 40. The threads of these portions may extend in corresponding or right and left hand directions.

The device of this invention is operated by a suitable motor arranged so as to be connected by a sprocket chain or its equivalent to a pulley 41. When the motor is in operation the drum turns in the direction of the arrow, and by reason of the portions of the belts 12 and 13, which extend around the drum being in frictional contact, the belts move as a unit, and in the direction indicated by arrows.

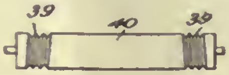

Fig. 2.

When the prints are arranged on the portion of the belt 13 previously described the motion of the belt carries the prints underneath the roll 14 and belt 12. It will now be noted that when the prints are entered into the space between the belts 12 and 13 these move the prints upwardly so that the heat of the portion of the drum over which the prints are disposed gradually increases throughout the first half of a revolution of the drum. This is of importance, because the prints are saturated with water upon entering between the belts, and unless the belts which absorb this water are quickly dried stretching and uneven running of the belts will result.

The speed of rotation of the drum is such that the heat affects the drying of the prints before these are carried by the belts to roll 17, but the prints having been dried on the curved surface of the drum have a curl conforming to the curvature of the drum. It will now be noted that the presence of roll 17 causes the belts on leaving the drum to move downwardly. This has the effect of curling the prints in the opposite direction, and since the radius of roll 17 is less than that of the drum it is obvious that the roll 17 operates to remove the curvature from the prints imparted thereto from the drum. It will be further noted that the diameter of roll 21 is substantially the same as roll 17, and that the belts 12 and 13 are so disposed on roll 21 that this roll will operate to curve the prints reversely, as these are carried over the roll by the belts.

When the prints are carried from the drum they are curled in a direction opposite to that which they tend to curl under the action of their coated surfaces. But when the prints are operated upon by the roll 17 they are curled in the way they tend to curl normally. In passing around the roll 21, however, the prints are curved in the direction in which they are curved by the drum, and this rebending or recurving of the prints compensates for the bending or curving made by roll 17, so that when the prints move to roll 22 and where the belts 12 and 13 separate, the prints are substantially straight, and in that shape fall into receptacle 24.

It will be noted that roll 22 is considerably less in diameter than roll 21, so that if a portion of the coated surfaces of the prints adheres to the belt and tend to move therewith around roll 22, the reluctance of the paper to curl abruptly to the sharp curvature of that roll will invariably operate to detach the portion of the coated surfaces which stick to the belt. Obviously by directing the belt 12 around the rolls 22, 26, 28, 30, and 19 a generous portion of the belt is at all times left exposed when not engaged in the operation of drying prints. This permits the heated air surrounding the machine to dry the belt thoroughly before the same moves into contact with belt 13. William Emanuel Stromberg and Edward H. Schmicking, 324, East Thirty-fourth Street, New York.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

RIXMO.—No. 382,137. Photographic paper. Sternberg and Wertheim, Rosedale Road, Richmond, Surrey; photographic paper manufacturers.—February 27, 1918.

New Books.

"Applied Optics: The Computation of Optical Systems." By Dr. Adolph Steinheil and Dr. Ernest Voit. Translated and Edited by James Weir French, B.Sc. Vol. I. (London: Blackie and Son, Ltd., 1918. 12s. 6d. net.)

Both the authors and the translator, in their respective prefaces claim that this is a book of applied optics designed for the use of the practical optician, but, as a matter of fact, the first three chapters of the four that compose Volume I. form a most valuable treatise on the properties and requirements of lens systems, and include a comprehensive study of the Gauss system that would have been invaluable to optical students quite unconnected with the optical industry if it had only been available before. The book, however, though published originally in 1890, now appears for the first time in the form of an English translation, and forms the first of the translations from the German that are to be produced. It seems strange that nothing less than a gigantic European war could persuade our educational experts of the extreme desirability of translating this and other important German optical works, but we may hope that now a start has been made the work will be done thoroughly, and that the numerous pamphlets and small monographs which exist will not be neglected.

To English readers Chapter 4, dealing with the computation of lenses, will afford the freshest matter for study, for this is practically the only book that deals adequately with the trigonometrical method of computing lenses. The simplicity of the method will probably be a revelation to those who hitherto have only been dazed by the awe-inspiring algebraical formulæ which make such a display in other books. Numbers of students have been deterred from any attempt at lens computation by terrifying equations, which have suggested that no one but a mathematical genius could possibly cope with the subject. On the other hand, the equations for the trigonometrical tracing of a ray through a lens are of a kind that an intelligent schoolboy can deal with, patient figuring being the chief qualification needed. The book is excellently printed, and the translator seems to have accomplished a rather difficult and wearisome task in as satisfactory a fashion as anyone could wish for. As a piece of book-making it is exceedingly good. Its large, clear type-setting and the ample use of diagrams in colours make for ease of reading, a consideration which has too little engaged the attention of publishers of optical treatises.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, June 8.

Manchester Amateur Photographic Society. Outing to Northenden for Poundswick.

Tuesday, June 11.

Manchester Amateur Photographic Society. "The Photography of Flowers." Messrs. Curson and Berwick.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, June 4, Mr. A. H. Lisett in the chair.

A lecture on "Interiors of Famous Mansions" was delivered by Mr. A. E. Bullock, A.R.I.B.A., who illustrated his discourse with a large collection of photographs and drawings, in addition to lantern slides. He dealt with the design and decoration of notable residences dating as far back as Tudor times, including also modern examples of artistic creation in the making of a residential mansion. The thanks of the meeting was conveyed to him by acclamation.

CROYDON CAMERA CLUB.

A session of unusual interest was brought to a close last week with a creditable exhibition of prints by members. The portraits, mainly contributed by the Rev. C. Le Warne and the President, Mr. A. F. Catharine, were really top-hole, and the latter, ever appreciative of merit, modestly stated they knocked the landscapes sideways. Mr. F. Latreille distinctly scored with a breezy representation of a Cornish coast scene, so harmoniously mounted as to suggest a pleasing relationship with Raines of Ealing. A new member, Mr. E. Scamp, showed several interesting prints; one possessing a decorative effect was coupled with such originality of treatment as sadly to upset some whose perceptions did not run that way. Mr. Harpur's contributions were studies of a polar bear and a zebra, both excellently rendered; the stripes of the zebra providing sufficient "leading-in lines" for a dozen or so important compositions. Mr. J. Keane was represented by Bromoils of admirable quality, happy in every respect, and evidently on friendly speaking terms with the camera. Mr. B. J. Rose also soared into Bromoil with a creditable decorative landscape executed in blue-green pigment, which, in a complementary sense, made some critics see red. Embryo-Bromoilists are sensitive souls, and Mr. Rose explained this was the only coloured paint he had in the house. Mr. W. H. Claypoole's rough proofs of landscapes, taken with the soft-focus "Portland" lens, indicated possibilities of many pictures in every print, with a nice feeling of luxurious insobriety pervading all. The Secretary, Mr. J. M. Sellors, contributed not a picture, the present enhanced price of blacklead doubtless acting as a strong deterrent to exhibition work. Mr. E. A. Salt was responsible for a portrait of a young lady without a body, the face, in Mr. Le Warne's opinion, having a fine "one-eyed stereoscopic effect," a definition which recalls severe differences of opinion in the past on one-eyed stereoscopy. From without, the cheerful and unabashed Mr. C. Bertram C. Wickison, F.R.P.S., sent a wonderful triple combination print which tastefully failed to reveal its composite character even to the closest scrutiny. It was stated that the picture was produced in ten minutes precisely, a period, which many would consider, none too long for hanging an exhibitor.

Words failed not in the discussion, Mr. J. Walker, in particular, giving full tongue, with nose dead on the scent all the time. His criticisms made even Ruskin's appreciation of Whistler fade into insignificance. Mr. Keane, who owes Mr. Salt more than he has had the opportunity of repaying, saw his chance with the bodyless portrait referred to. With scarifying expressions he proclaimed that no apology could be accepted or explanations entertained for such a production, which must stand or fall on its merits. "The absence of the body was absolutely fatal" (it often is). This aroused the exhibitor, who said he had never acquired the habit of apologising, and did not mean to start with a Bromoilist, of all people. The remarkable originality of treatment shown, which conventional minds could not be expected to understand, arose from the use of a hand-camera operated at the distance of one yard. At this distance the finder recorded far more than the plate saw, a fact overlooked in the enthusiasm of the moment. Close-range snapshotting, in his opinion, was the finest sport of all. He recommended Mr. Keane to vary a vegetarian diet by eating coke.

Commercial & Legal Intelligence.

Legal Notice.—A composition of 5s. in the £ has been declared in the estate of Montagu Alexander Pyke, photographer, Old Bond Street House, 6-8, Old Bond Street, W. The composition is payable any day, except Saturday, between 11 and 2, at the Bankruptcy Buildings, Carey Street, W.C.

Society of Lancashire Photographers.—A most successful inaugural meeting of Lancashire photographers was held at the Grosvenor Hotel, Deansgate, Manchester, on Tuesday, June 4, when a society of master photographers was formed. Several very interesting discussions took place on matters pertaining to professional photographers. The society will affiliate to the P.P.A. The officers selected were as follows:—Chairman, N. S. Kay, Manchester; hon. treasurer, F. Kenworthy, Oldham; committee, F. Ash, Blackpool; W. T. Carter, Rochdale; G. Connard, Ashton; C. Foley, Wigan; T. Foulds, Liverpool; Councillor Saronie, Liverpool; W. Smith, Burnley; A. Walmsley, Bolton; J. Watson, Blackpool; hon. secretary, F. Read, 14, Balfour Road, Southport.

News and Notes.

Photometer Tables.—A Table of Log$_{10}$ Sec$^2\theta$ has been compiled by P. S. Helmick, and published as University of Iowa Monograph No. 4, 1917. The table is intended for use with photographic density apparatus employing nicol prisms in their construction, and gives the photographic density of the plate, i.e., Log$_{10}$ $\left(\frac{\text{Incident Light}}{\text{Transparent Light}}\right)$, directly in terms of the angle of rotation of the nicols. The value of the function is given every 0°.05 from 0° to 89, and every 0°.01 from 89° to 90°, together with the tabular difference for each 0°.01 for the whole range. The table may be obtained on request from the librarian of the State University of Iowa, Iowa City, Iowa.

Capturing Enemy Trades.—The British Science Guild is organising a comprehensive exhibition of products and appliances of scientific and industrial interest which prior to the war were obtained chiefly from enemy countries, but are now produced in the United Kingdom. The exhibition, which will be held at King's College from about the first week in August until the first week in September, will show in the first place products chiefly imported from Germany before the war, but now made in this country; but it will also illustrate the remarkable developments that have taken place generally in our scientific industries. In many of these, as a matter of fact, Great Britain always excelled, and it is only our national quality of self-depreciation which has prevented the public from appreciating the fact that we were able to export to Germany apparatus and products embodying the highest scientific knowledge and technical skill. The general scope of the exhibition has been set forth in a preliminary leaflet which has been issued, from which it is noted that the exhibits will include chemical products; thermal, electrical, and optical appliances; glass, quartz, and refractory materials; photographic apparatus and material; surgical and medical appliances; and papers and textile products. It is believed that the effect of the exhibition will be to have a most stimulating influence upon scientific and industrial research; and the exhibits, and the demonstrations and lectures that will be given in order to explain them, will undoubtedly bring home to manufacturers, as well as to the general public, the great and growing part that science plays in industry. Further particulars may be obtained from the organising secretary, 82, Victoria Street, London, S.W.1.

Washing Prints—Some Suggestions.—It is an undoubted fact that perfect fixing is far more important than prolonged washing, but the object of this month's note is to offer some suggestions as to methods of getting rid of the hypo from bromide or gaslight prints. Many photographers have lately been compelled to use water-meters and now find it necessary to economise.

One method, particularly suited to our friends who print postcards in strips of six-on, is to fix a board sloping from the tap to the sink and to use this for washing and squeegeeing upon. The strips are taken from the fixing bath one by one and placed face up on the board, so that the water from the tap runs on the top end of the strip, flows down to the bottom end, and thence to the waste outlet. The strips are placed one on another until a thick pile is obtained. This pile is then turned over so that the strips are now face down on the board in a solid block, and a flat rubber squeegee is drawn quickly down the back of the first strip on the pile. This strip is then thrown into a dish or tank of water, and the operation repeated to every strip on the pile. If they are to be sulphide-toned it is necessary to repeat this operation two or three times more, and there is little waste of water if the worker is quick in the use of the squeegee. We regard the intelligent use of a flat rubber squeegee as a saver of time and water.

When large wooden washing tanks are used, the water should enter at the top and run out at the bottom, the hypo, being heavier than water, sinks to the bottom of the tank and is carried off. The outlet pipe (which should be at the opposite end of the inlet) should be fitted with a tap for regulation with the inflow, and it should be closed whilst the tank is being filled. Of course it is very necessary to turn the prints over occasionally. Another method is to place the prints in several complete changes of water. This method will economise water, and the success of it depends upon thorough draining of each print at every change.—"Rajar Trade Notes."

Germans Boycott Kodak Products.—The Frank Seaman, Inc. merchandising and advertising service, of New York, has come into possession of a photographic copy made by the American Legation at Christiania, Norway, of a circular which has apparently been distributed very widely throughout Germany, calling for what is virtually a boycott upon certain classes of American-made products.

This circular is signed by the Association of German Amateur Photographers' Societies, and is dated Berlin, October, 1917. It calls upon all loyal Germans to refrain from purchasing or using American-made photographic films, plates, papers or cameras, on the ground that "whoever purchases the products of enemy industries strengthens the economic power of our enemies."

The circular further points out and calls upon Germans to "remember for all time to come" that the American-English Kodak Company subscribed before the war between Germany and the United States, to "the round sum of 50,000,000 marks (10,000,000 dollars) of war loans to our enemies."

The boycott as suggested goes even further than this, and would strike out of use the word "Kodak" because the spreading of the word "does harm to the German industry in favour of the American-English."

A translation of the circular in full is as follows:

"It is the duty of every German to use only German products, and to patronise thereby German industry. Therefore, use for photographic purposes only German cameras, German dry plates and German papers. Whoever purchases the products of enemy industries strengthens the economic power of our enemies.

"Germans! Remember for all times to come that with the aid of your patronage the American-English Kodak Company subscribed before the war with the United States, the round sum of 50,000,000 marks of war loans of our enemies!

"There are no German 'Kodaks.' 'Kodak' as a collective noun for photographic products is misleading and indicates only the products of the Eastman Kodak Company. Whoever speaks of a 'Kodak' and means thereby only a photographic camera, does not bear in mind that with the spreading of this word, he does harm to the German industry in favour of the American-English."—"Bulletin of Photography."

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

REMEDYING THE COLOUR OF BROMIDES.

To the Editors.

Gentlemen,—In the "B.J." of this week (May 31), under the heading "Examination Questions in Photography," I notice that you recommend the use of a bichromate bleacher for improving the colour of a bromide print. I should like, if I may, to point out that the ferricyanide and bromide bleacher, as commonly used for sulphide toning, possesses considerable advantages over this. For one thing, there is no appreciable intensifying effect (as would indeed be expected from the chemistry of this bleacher), and in the second place there is no necessity either to wash for any length of time to remove a stain from the paper, or to use an amidol developer. I have used both M.Q. and para-amino-phenol (i.e., Certinal, Azol, and similar concentrated solution developers) for the purpose, and in either case the resulting colour is all that could be desired.

It will be perceived, therefore, that this bleacher has very distinct advantages over the bichromate bleacher in the matter of the time required for the operation.

I claim no originality for this use of the ferricyanide bleacher; indeed, I think I am indebted in the matter to a book by Mr. Welborne Piper.—Yours faithfully, L. Sowerby.

Trinity College, Oxford, June 2.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

A. B.—We cannot identify the lens from your description as it does not resemble any complete lens issued by Dallmeyer. It would probably be useless for portraiture.

J. F. Williams.—1.0, 1-10th; 2, 1-100th; 3.0, 1-1000th. Hence 1.5, 1-32nd approx., and 0.1, 4-5ths approx. We should think you could do what you want more easily with a table of logarithms than by graphic construction.

X.—(1) Probably the f/5.8. (2) Yes. (3) Reasonable. (4) A very old model; worth 10s. or 15s. (5) A mixture made by melting together asphalt and guttapercha. (6) Neither; the form of the filament is not suitable and the power is much too low.

G. C.—Among professional makers of carbon enlargements the wet collodion process is most commonly used for making enlarged negatives, but you could certainly employ the Kodak Transferotype paper, making an enlarged negative of fairly good vigour, and then transferring this to plain glass.

W. Sullivan.—1. We do not think you can get into trouble if the photograph is obviously a copy. You might mark it as such as a further precaution. 2. There are no standard prices for postcard portraits. Average at present 6s. per dozen. 3. We should think that either Ilford, Ltd., or the Paget Prize Plate Co. could supply you with P.O.P. postcards.

L. L.—1. The only ill-effect which traces of acid left in the film are likely to have is rotting of the film in time. It might take years for this effect to be pronounced, but we should think that if you could give the negatives at least five minutes' washing in running water the quantity of acid, then left in the film would be so small as to be negligible. 2. There is no advantage in adding bromide in solution; it makes no difference whether bromide is got into the developer by dissolving the dry salt, or by adding an equivalent quantity of the solution.

Sulphide.—I am enclosing a piece of flannel after straining sulphide through. Will you give me your opinion as to the brown stain? We have so many prints with small brown stains, and wondered if the brown stain in sulphide could be the cause.—M.B.

We do not think the sulphide is the cause of the stains in prints. The brown deposit in the flannel is probably caused by some dressing in the material which is affected by sulphide. If your sulphide is the "pure recryst," is white and makes a clear solution, we should look in other directions for the cause of the brown stains.

G. B.—We cannot see any reason why raising the roof should make any material difference in the lighting of your studio. We think that there must be some other factors, such as new and clearer glass, clean blinds, and newly-painted woodwork, which gives the effect of glare. We certainly do not advise you to go to the expense of having the roof brought back to its old level. Of course with such an aspect you must have no clear glass while the sun is on the building. White nainsook curtains are better than ground glass, or even than tissue paper pasted on the glass. We are constantly using a studio with a similar aspect, and find the white curtains control the light quite well.

Sulphide Toning.—Can you account for whites in bromide prints not being pure after toning with ferricyanide-bromide bleacher followed by ammon. sulphide, although good before toning? Would it be insufficient washing after bleaching—some authorities do not advise much washing—or has sulphide anything to do with it?—Sepia.

There is always a certain amount of veil. If anything more than very slight the cause may be a residue of silver compound in the prints from incomplete fixation. Washing after bleaching should not be more than five minutes. Sulphide, if of good quality, is not a cause, but we would not like to say that a bad sample would not have some effect.

W. E. H.—1. A surface-silvered mirror in first-rate condition reflects between 90 and 95 per cent. of the incident light. We should think you could say that reflection from a silvered surface (beneath glass) would be to the extent of about 90 per cent., so that illumination at B from a light-source at L would be only about 10 per cent. less than direct illumination at A. 2. You would be pretty safe in going on the basis that a 10 per cent. reduction takes place at each reflection. (3) If your object is specular (ray-for-ray reflection) there is nothing better than silvered glass—best, freshly silvered glass—and using the bare silvered coating, not through the glass. (4) If the rays travel through a certain thickness of glass and back again there is a certain amount of refraction. Also there is reflection from the first (non-silvered) glass surface. This latter in certain circumstances will give rise to a perceptible separate image. Without knowing what your object is, it is possible that you would obtain better results by using a diffusing surface such as white blotting-paper as a reflector. The proportion of light reflected is very little short of that of a silvered mirror, but, of course, it is scattered in all directions, instead of following the optical law of reflection, such that the angle of incidence is equal to the angle of reflection. A very good little book on these optical matters is Lommel's "Light" in the International Scientific Series, published by Routledge, but we believe out of print. You might be able to get a copy from Messrs. W. and G. Foyle, 121, Charing Cross Road, W.C.2.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less	1/-
Extra words	1d. per word.

(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

"Box No." and office address ... ... charged as 6 words.

For forwarding replies add ... 6d. per insertion for each adv't.

If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C.2.

THE BRITISH

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SUMMARY.

In an address before the New South Wales Association of Professional Photographers, Mr. Mark Blow dealt with the means which are chiefly and most efficiently employed in advertising a photographic portrait studio. Among these he placed first in order of importance the personal influence of the photographer in his business and out of it, and, second, the effect produced upon the public by the exhibition of his work in showcases, the reception-room, and by means of printed reproductions. On other means of publicity, such as newspaper advertising, posters, and the issue of coupons and invitations, Mr. Blow had much valuable advice to give as the fruit of his long and successful experience. (P. 267.)

A gathering of importance in the history of the photographic manufacturing industry took place on Tuesday last, under the chairmanship of Professor Sir Joseph J. Thomson, when the establishment of a Research Association, representing the co-operative effort of photographic manufacturing firms was formally inaugurated. A report of the addresses delivered by the chairman and by other leading scientific men will be found on page 272.

Some specimens of work by Mr. A. H. Robbins, of Malvern Link, have interested us by the degree to which the use of ample exposure and light development, coupled with suitable illumination in the studio, has served to dispense with retouching of the negative. (P. 271.)

In a contributed article, Mr. Dudley Kidd describes experiments of a kind within his capacity (our contributor is an invalid) on the question of rendering the printed-out photographic image unsusceptible to further change without the use of hypo. His method of "fixing" is, of course, practically that originally employed by Fox Talbot. (P. 269.)

Various practical matters, such as binding lantern-slides, drawing ovals, etc., were the subject of a practical talk by Mr. W. F. Slater at the South London Photographic Society. (P. 274.)

Some of the elementary considerations which need to be fully grasped as a preliminary to self-education in the art of studio portraiture are the subject of a leading article on page 266.

Conditions which are favourable to the utmost physical permanence of the gelatine film of the glass negative are the subject of a note on page 266.

The use of a strongly coloured solution by which the water in any pattern of washer for plates or prints can be tinted provides a valuable test for the efficiency of the apparatus, as regards a frequent replacement of the wash water by a fresh supply. (P. 266.)

A minor matter which contributes to the convenience of using two-light electric dark room lamps is the subject of a note on page 266.

EX-CATHEDRA.

Co-operative Research. The gathering which is reported upon another page surely marks an important event in the history of the photographic industry in this country. Under the auspices of the Department of Scientific and Industrial Research, British photographic manufacturers have been the first among all the industrial communities of the country to establish a co-operative research association for the furtherance of pure scientific investigation which shall benefit the industry as a whole. In addition to the members of the photographic trade who will be members of the Council of Research Association, this body will include within its membership Sir Herbert Jackson, Dr. H. S. Allen, and Professor J. Norman Collie. Arrangements have been made for research, designed to advance the photographic industry, to be conducted in the specially equipped laboratories at London University College. The photographic industry can quite legitmately boast that in the manufacture of sensitive plates and papers its achievements have enjoyed a reputation second to none throughout the world, and the establishment of this Research Association is sufficient proof that those responsible for the leadership of the industry are determined to leave no stone unturned in the effort to retain this premier position.

* * *

Why Not Free Sittings? In the excellent address by Mr. Mark Blow on the advertising of the studio, which we reprint on another page, it is interesting to note that, on the authority of the author, many of the larger studios in Australia which have achieved success through the invitation system now look down upon that system as degrading. Mr. Blow evidently does not share that view, for he adds: "Why photographic journals have so much to say against invitations is a thing which passes my comprehension." Apparently Mr. Blow does not regard it as undignified—we will not say degrading—to offer to do work for nothing on the chance of making something out of it afterwards. But probably his lack of objection to the free-sitting system is accounted for by the fact that in a sparsely populated country like Australia it is not susceptible to the same evils which have characterised it in Great Britain. Mr. Blow is addressing smaller photographers; if he were a small photographer in a minor town, and if he found that a firm of large resources temporarily encamped itself in his district with offers broadcast to people of any degree of local notability to attend at a temporary studio for the supply of a free photographic portrait of themselves we doubt if he would exhibit the same degree of complacency with which he regards the free-sitting system. As we have constantly sought to make plain, abuse of the system presses very hardly upon the provincial middle-class photographer, and generally has the effect of giving the photographer the character of a cadger and thus of witholding from him the respect which the public would otherwise have for him.

* * *

The Preservation of Negatives. While most photographers pay every due regard in the way of fixing and washing to the reasonable permanence of negatives it is doubtful if many give adequate consideration to the conditions under which a negative may be depended upon to keep in good physical condition for a long period. We are speaking now not of permanence of the image on the emulsion film but of that of the film itself in the way of retaining its strength and adherence to the glass support. No doubt in the case of many negatives this is a thing which is not of much account, since defects of this kind manifest themselves only after a good few years. But where the utmost permanence of the negative in every respect is a matter of importance it is as well to remember that the most favourable conditions in which to achieve this end are the use of nothing but a plain hypo bath (and water for washing it out) after development. In particular the use of a separate alum bath is at any rate a contributory cause to the disentegration of the gelatine film after a term of years; and we would even regard with some suspicion fixing-hardening baths into the composition of which alum enters. We mention this point because the other day a photographer suggested to us, apparently with no idea that there was anything harmful in it, the soaking of negatives in a weak bath of hydrochloric acid, followed by a brief rinse before drying them. Only time could show whether such a process as this (adopted for removing stains) would have a deleterious effect on the negatives, but it certainly is open to suspicion.

* * *

Tests for Washers. In purchasing a washing tank for negatives or prints the photographer will naturally look for such features of construction as durability and, in the case of a washer for prints, freedom from liability to tear prints or allow them to clot together in masses which do not then obtain free action of the current of water. But perhaps many do not realise that the most crucial test of any washing apparatus is the speed and completeness with which the water in the washing apparatus at any given time is removed and wholly replaced by fresh. A very simple test of the efficiency of a washer in this respect is to add to the water any solution which will colour it strongly and then to note the time, with the washer in action, which is required for the colour to be entirely removed. A little strong solution of potassium permanganate can serve for this purpose, although in the case of some waters the water itself may discharge the colour. If that is so, a little red ink may be used for the same purpose, the method being to tint the water to a fair extent and then, without any prints or negatives being in position, to note the time which the washer requires to be run before the colour has entirely disappeared from the water. A test such as this is one which anybody can carry out, and it serves to distinguish the efficiency of one washer from another better than anything else.

* * *

Switches on Dark-room Lamps. Manufacturers of late years have consulted the convenience of the photographer in so many matters of practical equipment that it may seem ungenerous to say anything which is in the nature of unfavourable criticism. A minor point which, however, has come within our notice in one or two instances of late relates to the very convenient form of electric dark-room lamp which is fitted with a three-way switch, a turn of which actuates either the electric bulb in the interior of the lamp or one placed outside upon the top to provide white light within the dark-room, whilst in the mid-position both are extinguished. We have wondered by what perverse motive a manufacturer has been prompted to fix the switch so that the knob is moved horizontally; that is, from front to rear of the lamp, or vice versa. When so placed one is always in doubt which position corresponds with the inside and which with the outside lamp, and it is easy to make a mistake when moving the switch from the midway position when neither lamp is in action. This drawback would be removed by the mounting of the switch so that it is operated up and down, the up position of the lever corresponding, of course, with the upper bulb outside the lamp chamber. A thing like this is quite a minor affair, but it is just as easy to fix the switch one way as the other, and the convenience to the user is immensely greater when the arrangement is such that the movement of the switch lever is itself an indication of which bulb will be switched on.

LIGHTING IN PORTRAITURE.

From examples which reach us from time to time accompanied by queries as to the best methods to light a figure, it would appear that many people have an idea that lighting can be reduced to a system, and that it is possible by giving a series of formulæ or diagrams that any desired effect can be obtained time after time. This is true to a very limited extent. Side light, front light, and top light all produce certain specific effects used alone or in combination, but these effects can only be compared when using a fixed unaltering model, such as a bust, without altering the position of the camera between the exposures. The point which most novices seem to overlook is the fact that as soon as the sitter moves his head, be it ever so slightly, the lighting is also altered, while if the camera is moved so as to take exactly the same view of the head as before the sitter moved still another effect is obtained. A clear appreciation of this fact tends to obtaining control of the light much more easily than by manipulating even the most perfect system of blinds, and it is on this plan that many of the most successful portraitists work. We recommend any photographer who has lighting difficulties to make a few experiments in this direction, and, even at the present price of plates, he will not find them a bad investment.

Let the lighting be of the ordinary "three-quarter" type; that is to say, the main light falling upon the head at an angle of forty-five degrees both from the top and the side and the front and the side, and make the first exposure with the head turned slightly towards the light. Then follow with an exact full face, and others with the head turned very slightly each time more and more away from the light till nearly a profile is obtained. Prints should be made of these negatives and the effect carefully studied. If it be desired an attempt can be made to produce an exactly similar series by keeping the head and the camera stationary and altering the blinds. This will prove more difficult, and as a rule less satisfactory. The defect that will be most apparent in the majority of cases is a want of softness and modelling on the light side of the face. The best way to remedy this is by the use of the head screen. Every studio should contain a small translucent screen which can be adjusted in any position so as to soften the light to any required extent. It may appear to make the lighting appear weak and give the idea that a long exposure will be necessary, but it must be remembered that it does not cut off light from the shadow side, and that if this were correctly exposed without the screen no more exposure will be necessary with it, but that the effect will be to preserve the modelling and texture in the highlights, the loss of which is so common in everyday work. Another use for the head screen is in making sketch portraits. When the toplight is opened immediately over the background so that the latter may come dense enough in the negative there is frequently an undesirable amount of light coming from behind the sitter. This may be subdued by placing the head screen so that it cuts off the excess, care being taken that the screen itself does not appear on the negative.

In ordinary life few people properly appreciate light and shade, but in the photograph there is nothing else. In the living model there is colour and constant change of position which distract the eye. Therefore, the photographer must cultivate his visual sense in this direction, and not only must he be able to recognise a pleasing effect directly he sees it, but he must be able, as we have pointed out in a previous article, to record it upon his plate by correct exposure and development. Although not strictly within the limits of our subject, we would point out the desirability of using one brand of plate only, and to master the working of it. Many photographers visit all their own shortcomings upon the platemaker and change the grade, if not the make, in the hope of obtaining better results. There are undoubtedly differences in the scale of gradations given by different plates under the same condition, but they do not approach those which the photographer can create by lighting and exposure. Moreover, the condition of the apparatus and the lighting of the dark room have a great effect on the quality of the negatives. We have often seen flatness caused by a foggy or dusty lens, or a faded dark-room lamp, attributed to the plate, the idea being that rapid plates will never give bright negatives; therefore, before trying systematic lighting it should be seen that the lens is clean and bright, the interior of the camera non-reflective, and the dark-room lamp above suspicion.

ADVERTISING A PHOTOGRAPHIC STUDIO.

We are glad to have the opportunity of printing the following address, delivered before the April meeting of the Professional Photographers' Association of New South Wales by the President, Mr. Mark Blow, one of the leading and most successful photographers in the State. Mr. Blow writes whereof he knows, for he is a photographer who for many years past has deliberately followed an advertising policy, and has closely traced the results obtained from the expenditure of a considerable appropriation. It is therefore of interest to have his experience set down in the concise and definite form in which he gives it. A few of the things which he says are perhaps applicable only in an Australian community, but the bulk of his subject matter may be said to hold good in its application to photographers here as to those in the Australian Commonwealth. It should be noted that Mr. Blow gives his advice in the interests not of the large studio, but for the benefit of the smaller photographer.—Eds. "B.J."

The paper that I have undertaken to give is entitled "Some Ideas on Advertising a Photographic Studio." When I accepted the task I had no idea it would entail so much time and careful thought as I have had to give to the subject. To advertise is to make public, and the first advertisement that I can find is an advertisement of a sale of land; it is recorded in Ruth, in the Old Testament, in the following words:—"Naomi, that is come again out of the country of Moab, selleth a parcel of land, which was our brother Elimeleck's, and I thought to advertise thee, saying: buy it before the inhabitants and before the elders of my people." I think it is quite a fitting thing that the advertising idea should have come from the Jew.

Well, we have come together to-night to discuss the hard facts of the pros and cons of advertising our business as portrait photographers. As business men, you want good, sound sense, and I have tried to give it to you in this paper. If I should fail the pain will be mine, and the smile will be yours. This paper has not been written for photographers in the larger way of business. They have succeeded on their own lines of progress, and if they can pick up a crumb of knowledge, or a hint of value, I shall be very pleased, but I have given my attention more especially to the small man and to the country photographer. This paper is composed of crisp, short sentences, each meant to be valuable in itself. I have avoided all padding. The photographer who takes one sentence for his guide and neglects the others will make a serious mistake.

In our case, to advertise is to get publicity, such publicity as will stimulate rumour.

General advertising is a field of commercial enterprise not to be ignored by those who are capable of handling it and not to be attempted by the incapable.

To advertise advantageously requires experience, judgment, and a thorough knowledge of the means employed.

Can any man say where the receptionist and the advertisement joins up? Is not one as much a force as the other? They both exercise a persuasive influence over the prospective customer, and it is hard to say where the pull of the advertisement ends and the task of the receptionist begins. They both try to get the prospective customer to exchange his money for your photographs.

One of the most vital factors in the photographic studio is the personal influence of the photographer himself. The cause of the preference of the customer for him is found in so many of his little attractive ways; his personality tells.

It is taken for granted that the photographer gives his best to his business both in labour, art, and material, and for the purpose of this paper advertising is to be taken to mean outside publicity to be obtained by various means, of which I shall deal with the following:—

1. Personal influence in the business, and especially in the social circle.
2. The show-case, the reception-room, the price list, circulars, etc.
3. Newspaper and other publications.
4. Posters, signs, and other such like means.
5. Coupons, invitations, and other schemes.

Personal Influence in the Business.

Get seized with the idea that you mean to advertise your business by your personal means, by your commercial tact, by handling your customers with care, and by giving them of your best in every case.

You can make the personal element so powerful as to force success upon your business. This is certainly the best and most lasting means of advertising.

If you are in a country town, keep a look out for any visitor of social, commercial, or professional importance. Get his photograph in your show-case, make it stand right away from all the other show pictures, with a special announcement under it. Get up musical evenings occasionally. Have periodical exhibitions of photographs, either in your own studio or in some public place, providing light refreshments for your visitors. Exhibit in your local show and get a prize, and then let the people know it for months after.

Get up competitions of different kinds, and let the prizes be photographs. Meet and know as many people as you can. A free picture to one or two whose influence is worth having, and whom you know will not talk about the gift,is a good thing.

Join every convenient public or commercial body in your neighbourhood. It may pay you to join a lodge, or a tennis club, or a cricket club, a golf club, a local progress association, the school of arts, or any and every other body that you can conveniently join. Make yourself known to as many people as you can, pay courtesies, exchange courtesies, be in evidence at every public event.

If you get a letter saying that "the photographs received are simply delightful, my friends are just charmed with them," what would you do with it? Would you just put it away as a pleasant memory? If so, you would miss the bus. What you should do is to send that customer half a dozen business cards, with your thanks, and an assurance of equal care with any friends they may send to you.

I know a photographer in this city of no mean ability who, when he was employed as an operator, was never allowed to appear without his coat on, but when he succeeded in starting a high-class studio on his own, with speculators to back him, he almost invariably came forward in the reception-room and the studio in his shirtsleeves It was only a little thing, but it had its effect. He did not last, and yet he did not know why. If people want to see men in their shirtsleeves they need not go to a first-class studio to do so.

The Show Case, the Reception Room, Price Lists, Circulars, &c.

The show-case and other displays at the entrance to the studio should be changed as often as possible. Every event in the town or locality should be photographed, and with the least possible delay, prints get into the show-case. Photographs of sitters taken last week should be in the show-case this week. Keep your show-cases clean and up-to-date, and don't let them shout the word carelessness.

The best advertisement is a pleased patron, and the next is a good show-case.

The reception-room should not be overcrowded with furniture or pictures. Try to strike the happy medium between a second-hand shop and a first-class waiting-room at a railway station. Too much is as bad as too little, and too little is bad enough. Don't hang a lot of engravings, or oils, or water-colour pictures in your reception-room unless they represent your own work. Don't let your furniture talk too loudly; let your room talk photographs and talk it loudly. While a photographer's reception-room should be precise it should have some air of commercialism in it also.

We cannot over-estimate the importance of first-class business tactics in the reception-room. The pleasant manner of approach, the business smile of welcome, the discreet feeling after the intentions of the customer, and the delicate influence to improve the order, are some of the virtues of a good receptionist.

The average client who comes into your studio has a hazy sense of doubt as to whether he is to get value for his money or not, and it is some satisfaction to him to be able to see a price-list and think that he is not being got at. He then exercises his own freedom of choice with that amount of authority that satisfies him.

Advertising by circular in a general way does not pay; unless you have a specially prepared list of names you are likely to spend money wastefully. If you send a circular to a number of people who seldom get a circular, your advertising may have good results; but if you indiscriminately take the telephone list, the directory, or any other public medium of collected names, you will find a miserable shortage in your balance-sheet at the end of the quarter. The intensity with which both large and small mail order houses swamp the post with circulars makes it a nuisance to many householders, with the result that but few are read.

Be sure that your matter is good, readable, and interesting; it must have merit; it should have novelty, or it may be only a remembrancer. Remember that in many cases photographs are an extravagance. Your advertisement should so clothe the extravagance as to make it appear an economical proposition. You might suggest various reasons why your readers should spend their money with you.

Don't say in your circulars "Get the shadow while the substance lasts," or anything else hinting at death. No one wants to be reminded of death. Such a cold-sweat circular would be worthy of the waste-paper basket.

Circularise those who are likely to attend your town through a land court, circuit court, a local show, a visiting show, or any other attraction.

Circulars or pamphlets of local events, such as excursions, shows, the coming or going of important personages, are good for a small town photographer.

A circular or other advertisement should not be over-wordy. Quaint, curt phrases are often telling, and of good result.

In your circulars avoid too much variety of type. Two or three faces of type are quite enough. Let your circular talk; flourishes and ornaments say nothing. A good slogan is a valuable thing.

Your circular represents yourself. Let the composition speak for you, let the type speak for you, and let the paper speak for you. Let it be you in pamphlet form.

Form-letter advertising is good when properly handled. When the typewriter came in that kind of type had great value, but some think that a good, effective printer's type circular is now just as good.

Facsimile letters are also always good when properly written and got up.

Newspapers and Other Publications.

Newspaper advertising in a small town pays the local photographer if it is the right kind of advertising, and it is done in the right way, and if it is not too expensive. If your local paper charges, say, 2s. or 3s. an inch, try them for a certain number of insertions. By so doing you will find a big decrease in the price as compared with the casual advertisement. Don't take more space than you can afford. Don't advertise recklessly; think out your scheme and then clinch it. When you have fixed for your space, then write your advertisement according to your space; remember that space is as valuable as matter. Don't indulge in too much padding. Say what you have to say in a bright, cheerful and businesslike way, and make the advertisement tell its own tale. Don't just merely make an announcement, but say something to the point. Appeal to the class of people that you want to reach.

When you see a man with a pleased smile reading his prettily worded advertisement you know that that man is about to lose money.

Make your lay-out good; write your advertisements to sell, not to amuse yourself.

The way in which an advertisement is prepared reflects the skill, or want of skill, of the advertiser.

You must have strong selling talk in your advertisements; the pretty drivel of the idealist is no good for pull advertising.

The amount you should spend in advertising may be anything from 2½ per cent. to 5 per cent. of your turnover.

If a man in a small way of business cannot write his own advertisements it is because he is not observant enough or imaginative enough and is inflexible. How can such a man succeed in a business? He will surely fail whether anybody else writes his advertisements or not.

Read all kinds of advertisements to get your ideas from them. Make a note of any good thought that occurs to you.

In writing an advertisement you want to get yourself into direct contact with the reader. You want to introduce, through your advertising, a mental suggestion, or a counter suggestion, and make the personal touch so intense as to pull business in your direction.

Don't exaggerate in your advertisements. For instance, don't say "I make the best photographs in the world," or "mine are the lowest prices in the country," or that you have all the latest inventions and infer that your opponents have none. You are wasting valuable space, your reader won't believe you, and your advertisement will do no good.

Advertising is only a means to get people into your studio; it is not a means to satisfy them—you must do that.

Posters, Signs, &c.

In poster advertising we have to contend with two hostile forces. There is that over-strung, over-sensitive, super-æsthetic individual who, if you met in an art gallery or exhibition, would be constantly buttonholing you to come and hear his opinion on all and sundry. He would point out to you all the good points and all the bad points, according to his idea, and risk the hope of his correctness in each case. This individual is continually writing to the Press screeching against poster advertising.

Then there is the Press itself. The first thinks that his artistic sense is injured, and the other knows that its business is injured by the competition of the hoarding.

Some say that poster advertising violates the public mind. They say that the eye should be free from this kind of assault, and that many sensitive persons suffer from the nuisance. I admit that our harbour and other scenic surroundings should be protected from spectacular advertisements, no matter how beautifully got up. I also admit that bills indiscriminately posted on road-sides, walls, palings, trees, telegraphic and other posts are a public nuisance.

In posters, signs and such like advertisements it must be admitted that if a name or a picture or a contrivance once gets fixed in the memory it is safe to say that it will be recalled when the subject is under consideration, and as the constant dripping of the water wears away the stone, so the constant sight of the same word or sign sinks deeper and deeper into the mind.

Coupons, Invitations and other Schemes.

When a shabbily-dressed man calls at a house with a smelly breath and smelly clothes, and a shabby sample case, and a carelessly rolled-up book of coupons, and offers to sell one for 1s., and tells a tale about his little wife and big family, and how long he was in the hospital, and tells of the hard heart of his landlord, and the lack of sympathy of the charity societies, he may sell a coupon; the buyer takes one to get rid of the man, but—and this is a very big but—what is the effect on your studio in the eyes of the public? I would not say don't have canvassers, but I do say it is playing with a very dangerous weapon.

Invitations.—To work the invitation scheme successfully it must be done on a lavish scale, and prices must be high. There must always be a reasonable excuse for inviting a prospective sitter; then, if he is one who can afford to pay, the operator must pay a lot of attention and be simply charmed with the sitter as an art model, and would just like to take an extra large negative for his own satisfaction. Then when the proofs are called for the receptionist has to take up the cudgels and make good. When you invite children you must always make a fuss over them, and let the mother think you are really most interested in them, and that you rarely get such interesting kiddies in your studio.

Invitations have been the stepping-stones of success to many of the larger studios of the present day, but these very studios now look down upon the invitation system as degrading to the profession. Why photographic journals have so much to say against invitations is a thing that passes my comprehension.

Advertising schemes, such as a baby competition or a beauty competition, are very questionable means of advertising for a small town. You are sure to displease those who are not successful. It is never their face that is at fault, it is always the photographer.

There can be no doubt that advertising in general is one of the most elastic of all commercial undertakings; by it many have made fortunes and by it many have lost fortunes. Bad advertising is sure to lose money, while good advertising should certainly stimulate business. The copyist in advertising is almost certain to go down; to be successful an advertisement must be original. It is only the original advertisement that strikes home. There is a telepathy in advertising that cannot be explained, but it is as sure as the turn of the tide.

Gentlemen, I have given you of my best after much thought, much research, and much compiling. There are many nuts in this paper; it is for you to find the kernels. This I am certain of, that any young man starting a photographer's business who follows the advice given in this paper, provided he has average business capacity, other things being equal, must succeed.

MARK BLOW.

FIXING PRINTS WITHOUT HYPO—SOME PRELIMINARY EXPERIMENTS WITH P.O.P.

As the shortage of hypo has led the Editor of this journal to suggest that experimenters should try new methods of fixing bromide prints, some experiments in the fixing of P.O.P. prints, extending over a year, may usefully be described, as they may suggest a line of experiment to others.

To prevent misunderstanding, a personal explanation seems called for. Being ordered by the surgeons to lie flat on my back for two years, and not even being allowed to turn on my side, I found it impracticable to fix P.O.P. prints with hypo. All I wanted was to be able from time to time to examine proofs of old negatives. To comply with the orders of the surgeon it was essential to think out the simplest possible way of fixing, or at least of depressing the sensitiveness of, P.O.P. prints. The method worked out is so simple that a finished print can be hung up to dry within a minute of its leaving the printing frame. The permanence of such a print is of a poor order; yet the photograph can be left exposed opposite a window on the mantelpiece of a room with a south aspect, and will show very little change in six months, though a few hours' exposure to sunshine will ruin it. Still, the print can safely be examined in sunlight again and again, provided these periods are not prolonged.

As several interesting points have arisen during these experiments, it may be well to give an outline of the theory that served as a working basis to start from. It is well known that silver chloride cannot exist, save in infinitesimal amount, in the presence of an excess of a soluble bromide salt. Some experiments with a different object in view had shown me that bromide of silver darkens somewhat more slowly than usual if it is soaked in a strong solution of potassium bromide. All that should be necessary, then, would be to soak a P.O.P. print in, say, bromide of potassium and hang it up to dry, leaving the free bromide in the print. Thus, the absence of washing would be a positive gain. Sir W. Abney writes:—"Potassium Iodide will, in the light, liberate iodine in the presence of oxygen, and this is yet more the case when it is also in the presence of metallic silver, or an unsaturated compound of silver, such as the sub-iodide; and the action of light on potassium bromide under the same circumstances is precisely the same. And we have also seen that the silver sub-salt is destroyed by iodine or bromine. Suppose we have silver bromide and potassium bromide exposed to light together: then, as fast as the silver sub-bromide is formed, it has a tendency to be destroyed by the potassium bromide, splitting up into bromine and other compounds." ("Instruction in Photography," p. 47.) Again, he writes lower down: "In a gelatine film, probably the bromine, when coming in contact with the gelatine, liberates hydroxyl or peroxide of hydrogen. This, as is well known, is a very strong oxidiser, and it will oxidise the neighbouring molecule of gelatine, or else the silver sub-bromide, and so produces an undevelopable image." ("Instruction in Photography," p. 49.) Here, then, we see that, in theory, our bromide-fixed P.O.P. print will be the scene of varied changes. To start with, when exposed to light, bromine will be liberated, which will destroy the silver sub-bromide as fast as it is formed, and in the process fresh bromine will be liberated. The liberated bromine will also set free peroxide of hydrogen, which will oxidise the gelatine or the sub-bromide of silver. Will the result be a fairly stable print?

The simple method, proposed above, of fixing the P.O.P. print in potassium bromide solution, seems open, at first sight, to two objections, which have probably deterred experimenters from following up this idea. First, the silver bromide left in the print might rapidly darken when exposed to light, just as a piece of bromide paper will under such conditions. Secondly, the free bromide left in the print may slowly bleach the printed image or spoil its colour. And the high-lights might also be ruined by the yellowish colour of silver bromide.' But experiment soon showed that all these fears were exaggerated.

A number of P.O.P. prints, with white margins, were made on Ilford, Paget, Imperial, Wellington, Kentmere, Baryta, and Solio P.O.P., both in the white glossy and white matt surfaces. These were soaked for one minute in solutions of the bromides of potassium, ammonium, and strontium; the strengths of the solutions varying from one grain to sixty grains per ounce of water. On plunging a print into such solutions, the colour rapidly changed to an unpleasant yellowish one, while the white margins became dirty The prints were then hung up to dry in a dimly lighted room. When dry the margins of the print were found to be nearly as clear as they were originally. (A plain unexposed piece of P.O.P. when soaked in a solution of potassium bromide shows a very slight yellowish colour.) On exposure to sunlight, the ugly yellow colour of the print—on some makes of P.O.P. (Ilford and Imperial proved the best)—rapidly changed to a fair sepia.

After several hours' exposure to winter sunshine the high-lights and margins turned a mauve colour, almost exactly matching the ordinary mauve-tinted P.O.P. In some cases longer exposure to sunshine actually lightened this tint, but, as a rule, the colour slowly darkened till the picture was ruined. Matt papers showed somewhat greater degradation of the high-lights than did glossy papers.

The differing reactions of different makes of P.O.P. may depend in part on the amount of free silver in the emulsions. But probably more depends on the presence or absence of "sensitisers," which act as bromine absorbers. As manufacturers naturally do not publish their formulæ, one is working a good deal in the dark. Of the papers tried, Kentmere was the least suitable. Then came Wellington, which darkened quickly. Paget P.O.P. turns an ugly chocolate colour, while Solio turns to a still uglier yellow that will not subsequently change to sepia. Ilford paper is the most suitable.

It is known that gelatine itself is a "sensitiser," and so experiments were tried with Ilford collodion P.O.P. The colour of the printed image is a sort of crimson violet: this is unchanged by soaking in potassium bromide. But on exposure to sunshine the image slowly fades after turning a bluish colour. Self-toning papers are useless, as the gold in them leads to a general darkening of the paper in sunlight.

To test the effect of leaving potassium bromide in the print, duplicates were made, both being soaked in the same potassium bromide solution; but one was well washed before drying. On all occasions the print with free bromide in it proved more stable than the washed print. Washing the print before soaking it in potassium bromide led to the formation of an ugly yellow colour that could not be changed subsequently to sepia.

To determine the best strength of bromide solution, a series of prints was fixed in varying strength of solutions, varying from two to sixty grains to the ounce. It was found that the stronger the solution the less quickly did the print darken in sunlight. But since there was very little improvement after a strength of fifteen grains to the ounce had been reached, that strength was regarded as, on the whole, the best to use.

Prints fixed in bromides have now been kept in the dark for about a year. In nearly all cases there is a slight amount of fading, while in a few cases the image has largely faded out, especially where the hygroscopic bromide of strontium was used. Yet these faded prints can be re-developed with hydrokinone or Rytol just as though they were ordinary slightly printed P.O.P. prints. They also stain as easily in the process.

When exposed to summer sunshine the bromide-fixed Ilford P.O.P. print usually gets spoiled by a general darkening in a day or two. But placed in the diffused light of an ordinary living-room six months causes but little change. At first there is a slight darkening in the colour of the image, and the white margins turn to a mauve tint. But after a few months this mauve tint fades, while portions of the print protected by black paper show the once white margins to be now darker than the parts exposed to dull light. The disproportion between the effect of sunshine and diffused light is very striking, as is the relative sensitiveness of ordinary bromide paper and the bromide-fixed P.O.P. print. Bromide paper placed in diffused light will darken more in thirty seconds than the bromide-fixed P.O.P. print will in six months. Yet both consist in the main of bromide of silver in gelatine. Further, if a strip of fresh bromide paper be placed with a strip of bromide-fixed P.O.P. in summer sunshine, the bromide paper will prove to be some ten thousand times faster than the bromide-fixed P.O.P. What, then, accounts for this striking difference? Possibly it is to some small extent due to the different quantities of silver bromide per unit area. But this cannot be the full explanation. Does the P.O.P. contain some substance which depresses the sensitiveness of silver bromide? Will the manufacturers of P.O.P. enlighten us on this point? For if it were cleared up we should possibly be in the way of preparing a P.O.P. emulsion that would give really permanent prints when bromide-fixed. It must be remembered that in seeking to fix a print in this way we are, from the manufacturers' point of view, sadly abusing the perfect product he gives us.

Hundreds of experiments with dilute acids, alkalis, reducers, oxidisers, etc., have been tried, so as further to depress the sensitiveness of the bromide-fixed P.O.P. prints, yet without success. The only thing that has been even partially successful has been ammonia. If a P.O.P. print be first soaked one minute in a solution of ammonia (1 dr. of the .880 to the ounce of water), and then washed in water for a minute or two before fixing in potassium bromide, the resultant print will be more stable than the comparison print soaked only in the bromide solution. But the colour is very unpleasing; in fact, the colour fairly well matches that of a P.O.P. print that has been soaked in water before being fixed in potassium bromide. This seems to show that the presence of free silver in the P.O.P. tends to the production of a pleasant sepia tone.

An interesting question arises as to whether there are not two processes going on in the bromide-fixed print. When placed in a bright light the print slowly darkens: when placed in the dark it slowly fades. When placed in diffused light the two processes nearly balance one another.

As to the darkening of the white margins of the print, there are also two processes at work in the case of some makes of P.O.P. After long exposure, if the white margin be examined by a strong magnifying glass—say, 10x—minute purple-brown spots can be seen. They are obviously small darkened portions of free silver or silver chloride which have become embedded in the fibre of the paper base that here and there resists the action of the bromide. There will also be seen a general—apparently structureless—stain of a mauve tint which pervades the emulsion.

To those who wish to test this process the following method is suggested as a starting point for future experiments.

1. Print on Ilford P.O.P. glossy paper to the exact depth you wish the final print to be.

2. Take the print from the printing frame, and, in diffused light of the workroom, plunge the print straight into a solution of potassium bromide—15 grains to the ounce of water—and keep the print

moving in the solution for one minute. Be sure the solution wets the gelatine, which is apt to be horny and repellent of liquid.

3. Take the print out of the solution and hang it up to dry, without blotting it off. If a really well-boiled rag is at hand the print can be blotted off. But if, say, a handkerchief fresh from the wash is used, stains are apt to be formed.

4. Dry in a dull diffused light.

5. Expose the dried print for a minute or two to sunshine, or longer to bright diffused light, until the yellowish colour of the print changes to a pinkish sepia. Then keep the print from needless exposure to sunlight.

If in a hurry, it is possible to brush the surface of the print (and the back also) with the bromide solution, and to mop off the moisture with a boiled rag. But this method is not recommended, as it is apt to leave patches not fully converted to silver bromide.

Whatever may be the permanent value of this process, it presents certain immediate advantages. There are many cases where but a slight degree of permanence will meet all requirements, and where the rapidity of the process will atone for its low order of permanence. For instance, wherever P.O.P. proofs are wanted for temporary purposes this method will be found useful. Workers in oil and kindred processes frequently want proofs of their negatives to work from as a guide; professionals want to send out proofs which shall not be too permanent, and they want to send out the proofs quickly; retouchers want a proof they can place in a good light, so as to see what progress they are making; press photographers want a proof for block-making; military men want glossy P.O.P. prints in a hurry, and only need prints of limited permanance; amateurs on tour want to send home ephemeral postcards made from their negatives but have no means of washing their prints; all these and many other classes of worker who want prints quickly for temporary purposes will find their need met by this bromide-fixing process.

Those who seek new effects might try using a toned paper P.O.P. which could be fixed in potassium iodide. The bright yellow image is stable, and might suit certain subjects.

Many experiments have been tried for converting the silver image into the stable carbonate and sulphate. But the difficulty is that by the time the change is completed the image is destroyed, reminding one of the surgeon who saved the limb but lost the patient's life.

The whole subject of the darkening of silver bromide has been somewhat pushed into the background by the more pressing need of studying the developable image. A certain amount of work has been done concerning the darkening of silver bromide, as this product is needed for actinometers. It might not pay financially, but it would pay intellectually if someone would consult the library of the Royal Photographic Society and give us an epitome of the information available, with bibliographical references. Attention might also be paid to methods of fixing such an image.

Finally, one word of caution. At the present time it is impossible to get P.O.P. that exactly conforms to the usual pre-war standard. Thus a paper bought one month will not always react exactly as a sample bought previously. Neither the Ilford nor Imperial P.O.P. gives such good colours with bromide fixing as they did a year ago.

DUDLEY KIDD.

FARQUHAR VITRIFIED PHOTOGRAPHS.—Since making reference a week or two ago to the establishment of the business of the Farquhar Vitrified Photograph Company at East Sheen, we have received an eight-page booklet which gives a general account of the process which the company is working, and of the many directions in which its vitrified photographs are capable of application. In these days many photographers necessarily have a special interest in photographs which are of absolute permanence, that is to say, not only immune to the effects of light and atmosphere, but also incapable of being physically damaged except by wilful breakage. To these qualities a form of ceramic photograph such as that which the Farquhar Company is making is able to add a very high degree of technical excellence as regards the colour and gradation of the prints, and it therefore should be a matter of much interest to many of our readers to acquaint themselves with the firm's resources, as they can do by addressing an application for this particular booklet to Derby Lodge, East Sheen, London, S.W.14.

THE NEGATIVE AND THE PRINTING PAPER.

WHILE there is the very great range of development printing papers—a great range, that is, as regards the degree of contrast produced—yet on the whole papers of this kind are susceptible of being placed into one or other of two large classes—namely, those which are "hard" in working and those which are "soft." In a general way the former are the choice of the amateur photographer and the latter that of the professional portraitist. Yet there is no essential reason why this should be the case except that in the great majority of cases negatives made in a professional studio conform more or less closely to a standard of quality which is a relic of the days when all printing was done on P.O.P., or even further back than that, when the albumen process was in vogue. Thus, the professional negative is usually of a kind which has a considerable range of tones from something like clear glass in the shadows to a fair deposit in the high-lights, and therefore does not call for a printing medium of the "hard-working" character which is the salvation of many of the over-exposed and insufficiently developed negatives made by the amateur worker. There is, however, no good reason why the possibilities which are afforded by the range of printing papers at the present time should not be utilised by the professional photographer on lines more or less removed from those which are customary, and, as will be seen below, certain advantages are discoverable in working along these lines.

We are led to put these considerations into the above form by the opportunity which we have recently had of examining a number of negatives and prints therefrom, the work of Mr. A. H. Robbins, of Malvern Link, and, we should say, the regular work of a photographic studio which is a one-man business, and owes its success to the personal labour not only in the studio, but in the printing-room, of Mr. Robbins. The negatives were of a degree of softness which probably many photographers would call excessive, and would prompt them to complain of over-exposure in the studio and insufficient development in the dark room. But this practice, in conjunction with the use of a fairly "contrasty" printing paper, is the system which Mr. Robbins purposely employs, as perhaps will be most easily understood by quoting his own description of it:—

"I take great pains to get a suitable negative for the work in hand and aim at a soft result, working on the old instructions *over-exposure and under-development* with a well diluted pyro developer. I also avoid flat lighting if possible by the proper use of the blinds and diffusers, and do not over-retouch. I have come to the conclusion that there are two things necessary to get good results: first, a good negative; second, a good printing paper or card that can, if necessary, be left in the developer for 60 seconds without staining. The first depends upon the photographer. The second, after using it for about fifteen years and testing various makes, I can honestly say that to get the best results your negatives will yield, and good prints every time, there is no paper or cards on the market to come up to Noctona. The developer I use is made up as follows:—

Monomet	16 grs.
Hydroquinone	30 grs.
Soda sulphite	½ oz.
Soda carbonate	½ oz.
Potass bromide 10 p.c. sol.	50 drops.
Water, boiled	20 ozs.

I find it an advantage to use soft water. *This is double strength.*

It requires to be said in reference to the above that the prints, while soft, are nevertheless brilliant and retentive of the textures and tones in the case of such subjects where light draperies and nurses' caps and collars occur in the portraits. And as regards retouching, we are bound to admit that when we turned from the prints themselves to the negatives from which they were made we were astonished to find that the latter did not bear a single mark of the retouching pencil. It is not to be supposed that the recommendation to expose fully, develop slightly, and to print on a paper which gives distinctively bright results is going to prove the formula by which anybody may secure similar results. Studio lighting naturally plays its part, and so also does the skilful balancing of the exposure and development of the negative in reference to the contrast-giving quality of the printing paper. But we have perhaps said enough to direct attention to a method of working which certainly obtains its best commendation from the quality of the work sent to us by Mr. Robbins.

EASTMAN KODAK COMPANY.

The annual report of the directors of the Eastman Kodak Co. for the year ending December 31, 1917, announces net profits of the combined companies as $14,542,567 (£2,998,467), after providing for war excess profits and income-taxes. This total is roughly £560,000 below that for the year 1916, which represented a record of earnings in the history of the company. During 1917 the dividend paid on the common stock was 30 per cent., as against 70 per cent. during 1916. The following table records the net profits up to and including the year which is the subject of this latest report:—

		£
Year ending December 31,	1895	49,656
,, ,,	1896	122,676
,, ,,	1897	185,232
,, ,,	1898	243,232
,, ,,	1899	335,919
,, ,,	1900	465,816
,, ,,	1901	517,347
,, ,,	1902	564,455
,, ,,	1903	606,740
,, ,,	1904	688,484
,, ,,	1905	827,610
,, ,,	1906	1,116,639
,, ,,	1907	1,446,479
,, ,,	1908	1,540,725
,, ,,	1909	1,619,087
,, ,,	1910	1,850,552
,, ,,	1911	2,401,910
,, ,,	1912	2,886,401
,, ,,	1913	2,920,090
,, ,,	1914	2,332,579
,, ,,	1915	3,245,600
,, ,,	1916	3,564,784
,, ,,	1917	2,998,467

It is hardly a matter of surprise that in the case of a world-wide business such as that of the Eastman Company an accentuation of disturbed conditions in every country during the third year of the war should have been reflected in a reduced total of earnings. Probably the causes of the decline exist more in European and other countries than in the United States, and are connected with the fact that during more than half the period in question the United States has been at war with the Central Powers. The Germans, as we noted last week, are threatening to boycott Kodak products in Germany, probably in ignorance of what would seem to be the fact that a boycott of German photographic products in the United States would be a much more serious thing. In a number of respects the Eastman Kodak Co. has strengthened its resources as an outcome of the war, and there can be no doubt that in the resumption of something like normal conditions it will be better able than ever before to continue the ascending course of commercial success which has characterised it, particularly during the past ten years.

THE BRITISH PHOTOGRAPHIC RESEARCH ASSOCIATION.

At the Connaught Rooms, Great Queen Street, Kingsway, London, on Tuesday last, June 11, a notable luncheon gathering was held to mark the inauguration of the British Photographic Research Association. Sir Joseph J. Thomson, President of the Royal Society, was in the chair, and was supported by Lord Rayleigh, Sir Herbert Jackson, President of the Institute of Chemistry, Sir William McCormick, Chairman of the Scientific and Industrial Research Committee, Sir Henry Trueman Wood, Lieut.-Colonel Moore-Brabazon, Mr. W. B. Ferguson, K.C., Mr. Edgar Houghton, Mr. Gerald Bishop, and many other leading representatives of British manufacturing firms.

Sir Joseph Thomson, in the course of an address, referred to the movement which had brought the importance of scientific research more prominently before the industrial community and congratulated photographic manufacturers on being the first class of industrialists who had united to form a research association designed to benefit the industry as a whole. In taking that course he thought they were following, although in a much more enlightened way, the ideal which industrialists of the early Victorian period had in front of them. The energy and application with which business was pursued in the early and mid portion of the nineteenth century were inspired, he thought, not so much by the idea of the personal accumulation of wealth or by the enjoyment and luxury which such wealth conferred as by the extension and development of the industry with which a manufacturer was associated. There was the desire to leave the industry in a more advanced state than that in which it was entered, and if satisfaction was felt at the money which was made in the process it was mainly as marking the successful development of industrial operations. But the succeeding generation, he thought, were less inclined to value an industry on this basis than by the income which it yielded, and their interest in it correspondingly declined. There was no doubt that their feelings were partly due to the degree to which the national services of the industrialists were ignored by the Government and the extent to which party-political services were recognised. However, the events of the last four years had opened the eyes of many of those engaged in industry to the necessity not only of a closer union with scientific work but also equally to the need of co-operative promotion of the knowledge upon which all the firms in a given industry depended in common. Pure research was among the most important of these and he, Professor Thomson, was glad to find that with the support of the Government it was being undertaken by a number of industries. In that beginning they should not expect too much at first. Great things sprung from efforts which appeared insignificant at the start. As an instance in the photographic industry he referred to the discovery of the X-rays, a result of investigation which probably the most far-seeing photographic manufacturer did not at first recognise as the establishment of a large and special branch of the manufacture of dry-plates, namely of those specially adapted for exposure to the X-rays.

Lord Rayleigh, at the request of the Chairman, said it gave him a great degree of satisfaction to associate himself with the steps which were being taken by photographic manufacturers, partly for the reason that he was perhaps the oldest photographer present, having taken up photographic work as a youth more than sixty-five years ago. He felt assured that there was a great need for research work in photography, seeing that so many of the essential facts upon which photographic processes were based were insufficiently understood.

Sir William McCormick further expressed on behalf of the Committee of Scientific and Industrial Research the satisfaction which was felt at the pioneer step which had been taken by the British photographic manufacturers. It was, he said, a striking thought that while we were nearly in the fourth year of a tremendous war we should have been preparing for the days of peace. It was sometimes said that every energy should be applied to getting on with the war, but there were two sides to that question, and it might be very truthfully said that the war would have been won in vain if we had failed to make preparation for the times which were to come after it.

Sir Herbert Jackson, in supporting the previous speakers, said that much which he would have thought it necessary to deal with had already been the subject of the address of the Chairman and of Sir William McCormick. He wished, however, to emphasise the fact that scientific men who had been brought into relations with manufacturers had had to admit themselves wrong in many of the thoughts which they had entertained of those engaged in industry. It was commonly thought that the manufacturer was opposed to scientific ideas and was himself unscientific in the methods and process of reasoning which he adopted. Therefore he wished to say that he had not met a single manufacturer of whom that could be truthfully said. He had had occasion to encounter a great many, and his experience had been that people who had not had orthodox scientific training nevertheless displayed the true scientific spirit in their interpretation of facts, their acute observation, and their connection of one fact with another.

Mr. Gerald Bishop, in an address briefly outlining the scope of the work of the established Photographic Research Association, said that a feature which would distinguish its work from that done in the laboratories of manufacturing firms was that research would come first and industrial application second, whilst in the commercial laboratory it was inevitable that these objects were pursued in the reverse order. He welcomed the establishment of an association also for the reason that it had brought photographic manufacturers and scientific men together and had established relationships from which undoubtedly both of them would be able to profit.

Mr. Edgar Houghton, in proposing a vote of thanks to Professor

Thomson for his chairmanship of the meeting, added a few words in explanation of the constitution of the Research Association, according to which membership was open not only to actual photographic manufacturers but also to those who were less directly interested in its objects. He hoped that all those who were eligible for membership of the British Manufacturers' Association would join it, and that generally all those in any way connected with the industry would consider the importance of furthering its progress by contributions to the Research Association.

Professor Thomson's brief acknowledgement of thanks brought a most interesting and enthusiastic gathering to an end.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication

Some Speculations on Studios After the War.

The future state of studio portraiture is a matter about which many interesting conjectures might be formed.

Will it be possible after the war automatically to revert to the *status quo*? and, if so, will we welcome such a reversion? Will business go on indefinitely as it is to-day, or will a totally new aspect arise? Will the studios all pass into the ladies' hands? To go further, will the war leave us with no such a thing as portraiture at all?

The easiest view is the one that everything will gradually slide back to its old place; patronage assuming its old levels by loss of war-caused inflation; materials and assistance falling in price as goods and released labour come back to the market, and prices going down as new studios, whose attraction is cheapness, begin to sprout up from nowhere in particular. This may come to pass, but there are possibilities to prevent it. Granted that the cessation of hostilities will influence patronage, release labour, and give the manufacturers a chance, will the price of goods or assistance fall to any extent? Competition will tend to reduce the cost of plates, papers, and chemicals, but not to the old rates, for the chief competitor—Germany—will be (or should be) barred out, while conditions with regard to labour may be anything at all.

People connected with office routine prophesy that few clerks will return to the desk after a taste of life in the open. If clerks, why not photographers? The attitude of photographers who have changed the retouching lead for a rifle or the rubber gloves for a gas mask seems a bit mixed. There is one chap out there who considered the dark room and 30s. per week as the components of Heaven after a few months' soldiering. Another, after two years and some wounds, affirmed that the trench was infinitely preferable to any photographic premises. Which view is the commoner it would be hard to say, but if any photographer at present in the trenches listens overmuch to Colonial or American comrades, whether he decides to return to the profession or not, it is long odds that he'll contemplate going abroad.

Supposing that the released armies fail to supply portraiture with exponents, will the business become a ladies' monopoly? And, if so, will it be more profitable to work? It may certainly become a ladies' profession, but if this is due to a dearth of men the same cause will leave the girls an open field in many other occupations, so they are not likely to accept anything less than men would. Boys might be recruited, but the modern boy is out for big money, and he can find it in the machine shop or shipyard, and will continue to do so for many years, in all probability. The studio used to be thought more suitable for a well-bred boy than an engineering concern, but that kind of idea has been somewhat damaged since 1914, so it is possible we may be left without regulars or recruits unless something is done to preserve the art.

The optimist says, "Why worry? We'll pull through." Unfortunately pulling or muddling through is an expensive process. The pessimist might argue that when the war is over there will be no portraiture, for the reason that everyone will be removed to more essential occupations. If professional photography is to flourish it needs a little intensive cultivation, and if expenditure is on a compulsorily higher level this will be much easier. With materials and workmanship at a low figure there is no incentive to careful work, economy, or studious endeavour. What's a plate more or less at 1s. 9d. per dozen? Why should an assistant bother about night classes or private tuition when he or she can see no possibility of a respectable return?

When plates, etc., and labour too, are expensive, the use of them is more considered; hence the business becomes more respected. It is worth more to the manufacturer, more to the worker, more to the customer (who gets better results), and consequently many times more to the owner.

The above, maybe, is only an opinion; but if there's any truth in it, things may be all right yet for photographers big and small, for it is almost certain that goods and assistance will not come back to their old price.—Thermit.

New Books.

The Art of Retouching.—A new edition of the manual familiar for many years under the title "Johnson's Retouching" has just been issued by Messrs. Marion. It is the ninth edition of the original work, and the third which has appeared since the text-book was issued five years ago as an altogether new manual under the joint authorship of Messrs. T. S. Bruce and Alfred Braithwaite. The present edition does not differ from the two which have immediately preceded it as regards the text and illustrations, but the letterpress is now printed on a good antique paper which makes for more comfortable reading. The fact that three editions have been called for within a comparatively short time emphasises as well as anything could do the wide usefulness of this instruction manual to those engaged in the photographic profession. The volume is divided into two parts: The first by Mr. Bruce, dealing with the retouching of negatives with the pencil, knife, and by other means; the second, by Mr. Braithwaite, providing the same description of practical instruction in the working up and colouring of prints and enlargements.

A point which is specially deserving of emphasis in regard to Mr. Bruce's contribution is that a very comprehensive view is taken of the retouching which may be carried out on a negative. Too often we find among retouchers the tendency to think that when the film has been dealt with by pencil or knife nothing further can conceivably be done to it as a means to making it perfect for printing. Many a printer will bear us out when we say that very frequently the retoucher leaves a great part of his work undone. He could contribute immensely to the quality of the prints if he were to recognise more clearly that his work should extend also to the glass side and should include such modifications as stumping, matt-varnishing, or shading with tissue paper—all of them things which too often are left for the printer to do in addition to his work proper. We are glad to see that Mr. Bruce devotes a great deal of his space to these supplementary processes, for which reason it is to be hoped that the book will find a place in every studio establishment where there is not a copy, for its very practical advice from one who has been engaged in retouching of all descriptions throughout the whole of his life should do much to expand the sphere of retoucher and to relieve the printer of work which after all is of a kind which he should not legitimately be called upon to do. If greater heed were paid to these considerations the quality of work from many studios would be greatly improved, whilst the technical operations, which are now divided between the retoucher and the printer, would be more economically carried out.

Our own publishers, Messrs. Henry Greenwood and Co., are the special selling agents for the manual, which is supplied by them, price 3s. 4d., post free.

Photo-Copies.—The Metropolitan Water Board has renewed the contract of J. Halden and Co. for the supply of photo-prints for the engineer's department for a further period of twelve months, at an increase of 10 per cent. over the 1917-8 prices.

Lancashire Master Photographers.—A general meeting of the above will be held at the Wellington Hotel (opposite Central Pier), Blackpool, on Tuesday, June 18, at 6.15 p.m. A cordial invitation is extended to every master photographer in Lancashire who is able to be present.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, June 17.

South London Photographic Society. "Chat on Pictorial Photography." S. Brigden.

Tuesday, June 18.

Manchester Amateur Photographic Society. "Landscape Photography." H. B. Bradley.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, June 11, Mr. G. B. Clifton in the chair.

A demonstration entitled "The Negative" was given by Mr. W. F. Slater. It may be said that its theme was a two-fold one, namely, that density of a negative is conditional by the exposure which the plate receives, whereas the contrast of a negative is conditioned by development. Mr. Slater prefaced his demonstration by dealing in a very lucid way and with the aid of diagrammatic models with the qualities of a negative which are commonly known as density and contrast. Using a series of mounted tints representing different tones of the subject he showed how they had their counterpart in the range of densities in a negative, and how the greater degree of development increased the contrast of a negative by increasing the step between successive tones. With the same series of models he showed how the action of development was modified by under or over exposure of the plate. These explanations, it should be said, were preparatory to the lecturer's advocacy of systematic development of plates by time. He considered that development for a given time at a given temperature was a more satisfactory method than the system of factorial development, one defect of which was the over-development which under-exposures obtained in it. Mr. Slater gave it as his practical advice that the photographer should find for himself the time for which a given brand of plates should be developed by giving to six plates the same correct exposure and developing them together in the same solution for a series of times such as 1, 2, 4, 8, 16, and 32 minutes. It was then easy to select the time which yielded the best negative for the photographer's purpose and to adhere to that in subsequent work. The time thus found would hold good only for the same variety of plates and at the same temperature of developer. In answer to a question he said that in his experience the temperature of the developer altered very slightly if the developing tank was completely closed and filled with solution. He instanced the case where in a dark-room at 40 degs. F. the temperature of the developer (65 degs. F.) fell only 3 degs. during 20 minutes development. Mr. Slater then proceeded to develop a batch of six negatives for different times, finding that a time of 6 minutes yielded the best negatives. He then developed a series of plates which had received exposures in the ratio 1, 2, 4, 8, 16, and 32, showing the effect of under and over exposure with time development.

Mr. W. B. Ferguson, in complimenting the lecturer upon his exceedingly clear representations of the effect of exposure and development, pointed out that the difficulty of the temperature altering during development might be easily avoided by using the developer at the temperature of the room and by developing for a time which was calculated for that particular temperature. It was an easy matter to construct a table or scale of temperatures for that purpose and such tables were drawn up by many makers of plates. Within the past few days he had had occasion to make use of the tables supplied by the Ilford Company for the development of their new panchromatic plates, and had found them perfectly reliable over a very considerable range of temperature.

On the proposition of the chairman a very hearty vote of thanks was accorded to Mr. Slater.

CROYDON CAMERA CLUB.

After a most successful season, materially helped by many good friends from other societies, the informal session started last week, and not being confined to photographic topics will tend to enlarge those minds in which room has been allowed for expansion. Mr. H. Guy Johnson was the lecturer for the evening, and aroused real interest with an able exposition of the "Thermophone" telephonic receiver.

Most are familiar with the principles of telephony, but it may never have occurred to some that the carbon transmitter is an absolute impossibility notwithstanding it fulfils its functions excellently. How loose contacts between carbon granules through which an electrical current is allowed to flow, on receipt of the most complex sound waves, which introduce variation of pressure between the granules, can vary the current in such a way as to transmit electrical impulses which permit almost exact reproduction of the original sound, is magic indeed. And this with a variation of current strength which may be a fraction of a millionth of a watt. (N.B.—It takes one watt, approximately, to run the familiar 3½ volt "flashlight" bulbs). Next imagine anyone deliberately setting out to design and construct a telephone receiver based on a heating and cooling effect in a fine wire, due to microscopic variation in current strength.* Such a notion would seem to indicate a state of mind intellectually comparable with that of the "mad hatter" in "Alice in Wonderland," yet on this principle the Thermophone is based.

The chairman, Mr. John Keane, in introducing the lecturer, said that all would be proud to have another remarkable British invention brought to their notice. Mr. Johnson then very clearly explained the principles of telephony, and pointed out that the Thermophône receiver (invented by a Russian, and perfected by a Dutchman) consisted essentially of loops of platinum wire, 1-1000th of a millimetre in diameter, in parallel, which are kept heated by the passage of an electric current, and gain and lose heat on receipt of pulsations from the transmitter. This disturbs the surrounding air in the chamber, and reproduces sound more faithfully than a magnetic receiver can achieve. The extremely ingenious way in which the ultra-fine wire is obtained may be mentioned. A platinum wire is drawn in the usual manner, then electroplated with silver and re-drawn, these operations being repeated several times, and finally the silver is dissolved with acid leaving an almost invisible platinum wire behind.

To the discussion Messrs. E. H. Carpenter, M. F. Hecht, and C. Rafferty, F.R.A.S., contributed. All, including the lecturer, are wireless experts, and to ordinary minds they conveyed a distinct impression that they were conversing in English, and nothing more. The first, however, did make a direct appeal when he said that the energy represented by the alcohol contained in one drop of Government ale would, theoretically, keep a telephone going for fifty-eight years. Those who have ever tried to get a peg-up by the aid of this fluid will appreciate the full significance of the statement. Mr. F. C. Reynolds—who had previously pointed out that if ignorance were a crime most of the members would be in jail—congratulated Mr. Johnson on the remarkably clear way in which he had dealt with his subject. A most hearty vote of thanks was accorded the lecturer.

South London Photographic Society.—At the last meeting of the session Mr. W. F. Slater showed a very simple method of masking and binding lantern slides. He used strips of non-gummed opaque paper cut to 4 ins. by 1½ ins., usually selecting a distinctive colour. In order to mask the slide correctly he used a white mounting-board, on which were drawn two fine black lines at right angles to each other. The slide was placed film side uppermost, so that one of the lines showed the edge to which it was desired to work. If there were perpendicular lines, such as the side of a house, the drawn line on the board should run parallel with the subject. It was only necessary to wet the opaque paper, to place it on the film side, using the drawn line as a guide and press into contact; the gelatine surface was sufficient to cause the paper to stick. The masking of the next side was absolutely simple—simply turn the slide round, place the strip of paper exactly in line with the drawn one on the card, and move the slide up or down until the line drawn at right angles was in the desired position, and proceed as before. He made a practice of marking a whole batch at a time and trimming the masks afterwards; the pieces trimmed off could be used for a further set. The spots were cut out of gummed paper by the aid of an office punch and stuck on the mask under the cover-glass.

For binding he preferred long strips of binding paper, both sides of which should be wetted, and the binding process was commenced in the middle of the edge, never at a corner. Lay the binding strips gummed side uppermost, and place the slide on the strip in an upright position and turn over, keeping the edge well in the centre. If worked in this manner it was possible to bind as many as sixty slides in an hour. Titles he placed along the top edge, so that they could be seen at a glance without having to take the slides out of the box.

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* It was stated in the discussion that a telephone can detect ·0000000000000044 watt. For speech, a few noughts must be deleted, and they will hardly be missed

The drawing of ovals for masks, etc., was then demonstrated, Mr. Slater being asked to draw an oval 4 ins. by 2 ins. A straight line 4 ins. long was drawn, and bisected in the centre by a line 2 ins. long at right angles. A pair of dividers were adjusted to 2 ins. between the points, measuring from the centre of the 4-in. line to one of the ends. For easy reference the 4-in. line was called A-B, the 2-in. line C-D. One point of the dividers was then placed on C and a line struck through A-B, on both sides of C-D. The operation was then repeated from point D. At the point where the lines crossed A-B pins were placed, and also a pin at the end of A-B (three pins in all). A piece of cotton was tied round the three pins and the pin at the end of A-B removed, a sharp-pointed pencil taking its place. By keeping the pencil inside the cotton and working round the two pins a perfect oval 4 ins. by 2 ins. was drawn.

It was a very mixed programme, for the lecturer then proceeded to talk about the respective values of reflectors and diffusers. The use of reflectors resulted in false lighting and modelling. If anyone wished to experiment and test for himself the truth of this, let him obtain a ball, and place it so that one side was brilliantly lit while the opposite side was in the deep shadow. The high-lights and shadows showed extreme contrasts; nevertheless, the ball was still round in appearance. If, however, a reflector was placed so as to lighten the shadow side, as in professional portraiture, a false effect was obtained, and the ball at once lost its appearance of roundness. Diffusion of light by the aid of butter muslin was advocated, for while it decreased the brilliancy of the high-light, and necessarily the contrasts, exposure was not lengthened, as one should always expose for the shadows.

Exposure meters and latitude in exposure and development formed a very interesting subject in the hands of so able a demonstrator. Mr. Slater introduced a new method of working the Bee meter. He never used the exposure scales on the disc. The meter was constructed on the system that a plate possessing a speed of 1 (Watkins) would require 1 second for exposure at f/8, if it took 1 second to match the tint. Therefore, if it took 6 seconds to match the tint and one was using a 180 Watkins speed plate, all one had to do was to divide the plate speed by the time taken to match the tint; the answer would be the exposure at f/8. While there was a big latitude in exposure, there was none in development. This was demonstrated by two sets of prints taken from negatives, one set having received exposures in a ratio of 1, 2, 4, 8, 16, and 32, and also from a further set all correctly exposed, but developed for 1, 2, 4, 8, 16, and 32 minutes respectively. While the first set showed little or no difference, the second set fully proved that incorrect development altered the quality of the resulting negative.

News and Notes.

Tribunal Appeals.—At Boston, Alfred Nainby, forty two, single, photographer, was granted final exemption for six weeks, with leave to appeal.

At the Shoreditch Tribunal, on Friday, June 7, the Mayor, Councillor H. Busby Bird, J.P., in the chair, David Allen, 107, Mansfield Street, E.2, photographic material supplier, appealed on business grounds for James Hazel, aged forty-three, grade 2, works manager. Mr. Allen's solicitor claimed that Hazel was in a certified occupation, as he was a sheet metal workers' foreman and manager. For some years Mr. Allen had been unable to take an active part in the business, and Hazel had been carrying it on for him. Incidentally he mentioned that Allen's real name was A. J. Chapman, and Capt. Fisher, the Military Service representative, said the application should have been signed "A. J. Chapman, trading as David Allen"; it would have been much more honest and straightforward. Mr. Stockwell (solicitor) said he was registered under the Business Names Act. Capt. Fisher: That may be, but that does not prevent him being straightforward with us. Mr. Stockwell went on to say that he had been manager, and in the firm in all twenty-seven years. The business was started in 1878, some twenty-five to thirty people being employed, the stock amounting to about £800. They had five men. They were making metal photographic apparatus for the R.A. Force, for which work they were contracting direct with the Air Board, and also sub-contracting. They were really the only photographic material house that made this kind of stuff, and had a monopoly. They were special cases to carry the camera carried by our aeroplanes when out spotting and photographing. In all they did about 75 per cent. of the turnover—amounting to £6,000 a year—for the Government. Hazel had the technical knowledge necessary for the carrying on of the business in the absence of his employer. He was there at 8 o'clock in the morning and stayed till 6.30 in the evening, when he took home the books and did the counting-house books, there being no one else who could. Capt. Fisher asked if any one in the firm held M.A.R.O. certificates, and Mr. Stockwell said "no," although he believed they were in the exempted trades as sheet-metal workers. Hazel had worked on the firm since a lad, and at the present time his employer had been away for two or three months, and cheques were sent on to him to sign. Capt. Fisher asked which head they claimed to come under in the certified occupations. He did not for one moment admit that they came under that head at all. Mr. Stockwell pointed out that this photographic business was of such importance in the war that as sheet metal workers for dairymen were in a protected occupation he thought it was near enough to say this was one. All the same, he did not press that claim, and left it to the tribunal to decide whether this work for aeroplane photography was not of the highest national importance at the present time, and a trade that could not be dispensed with. There was no one who could possibly carry on if he went into the Army. Capt. Fisher said the nearest they could get to their claim was that this might be called a protected occupation, not a certified. Major Weber, of the 2 1st City of London Volunteers said the whole thing was upside down. As it was the tribunal did not take any notice of this protected occupation list, as it was only a list of those trades which were most essential, but it was always within the discretion of the tribunal as to whether they took no notice of it, and decided that the Army was of more importance than the trade the man was in. The Mayor expressed astonishment at the small turnover of the firm for such important material for photography at the present time, but Mr. Parry said it was not expensive stuff they had manufactured. The tribunal discussed the case fully, and decided that this work was of national importance for the time being, at any rate, and granted four months' exemption.

Commercial & Legal Intelligence.

Legal Notices.—A receiving order has been made on a creditor's petition against Harry Saville Thorne, chemist and photographer, 5, Finkle Street, Selby, Yorks.

Correspondence.

** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

** *We do not undertake responsibility for the opinions expressed by our correspondents.*

REMEDYING THE COLOUR OF BROMIDES.

To the Editors.

Gentlemen,—The use of the ferricyanide and bromide bleacher for re-developing bromide prints was not suggested by myself, but, so far as I can recollect, by Mr. Somerville, a long time ago. It is a good method for prints that need very little alteration, and possibly Mr. Sowerby may have seen it referred to by me on some occasion, though I cannot say that I remember ever having mentioned it.—Yours faithfully,

C. Welborne Piper.

June 7, 1918.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

A. S. T.—(Paris).—The title is "Illustrated Guide to Inter-Lens Shutters," issued price $2.50, by W. O. Hammer, 1085, Fourteenth Street, San Francisco.

Ferrotype.—We do not know formulæ for the collodion emulsion. Perhaps Messrs. Mawson and Swan could help you or put you in the way of sensitising the plates by the wet-collodion process, as was done generally for this class of work until the introduction of the ready-sensitised plates, which are now difficult to obtain.

H. W.—We are sorry we are quite at a loss as to the preparation which you have in mind for transferring the coating of printing papers to other supports. So far as we know there is no reliable method of doing this in the case of ordinary printing papers, except, of course, by the carbon process. A ready means is available in the Transferotype paper made by the Kodak Company.

B. O'D.—The photograph is made by exposing three negatives, each with a separate expression of the sitter, on a plate with a ruled screen, something similar to that on the celluloid, close against the film and moved for a minute distance between each exposure. We have had frequent articles on this process in the "B.J." and in the 1918 "Almanac" also. The apparatus is made commercially by several firms, e.g., by Messrs. Move-O-Graphs, Ltd., 60, Doughty Street, London, W.C.1.

C. and J.—If your window is 6 ft. high from the sill, that is to say, the top of it is nearly 9 ft. from the floor, the room should answer very well for every class of work except groups of more than three or four. In taking full-lengths you must bring the sitter as near as possible to the window and cover the glass to 4½ ft. from the floor. The half-watt lamps should be adjustable between 8 ft. from the floor for standing figures to 5 ft. for bust portraits and children. If the light is kept high the exposure is prolonged, more than twice the exposure being necessary at the former distance as compared with the latter.

F. C.—In our experience slaty-blue markings of the kind shown on the postcard are due in the first instance to incomplete fixation of the prints. A certain amount of silver other than the image is left in the print, and in the toning process this assumes a bluish colour. We think that if you make it a practice to pass all prints through two fixing baths in succession and keep the second bath reasonably fresh by making it No. 1 as soon as it has done much work and mixing up a new bath for No. 2; then if you work on this system you will have little cause to complain of these bluish stains on toning.

A. L.—Ordinary paints (made with linseed oil) will resist alcohol for, at any rate, a reasonable time, providing the paint is allowed to become thoroughly hardened before immersion in the spirit. Similarly, many other paints, such as asphalt (consisting of asphaltum dissolved in chloroform), would resist spirit, though we would not say that the material itself (the asphaltum) would be quite impervious to the spirit. We should think the best thing you could do would be to state your requirements to a firm of paint manufacturers such as Messrs. Lewis Berger and Sons, Ltd., Homerton, London, E.9., who, from their wide series of paints for all purposes, could select one which would suit you.

S. H.—It is simply a question of camera extension in relation to the focal length of the lens which you have. Certainly you won't be able to get sufficient enlargement with your 6-in. lens and present camera. You could use your reflex and get enlargement up to nearly four times (which we think would be sufficient) by using a three-inch lens, and there is no reason why the result should not be equally satisfactory if done with this equipment. A microscope in conjunction with a camera is not a suitable arrangement for this work, the object which you are photographing being too large. The best outfit for the purpose would be an old pattern of camera giving, say, 30 ins. extension, in conjunction with a lens of short focus, say, about 4 ins. This combination would enable you to get any degree of enlargement and the necessary sharpness in different planes of the subject by stopping down the lens.

F. A. H.—It is difficult to account for the yellowish spots and patches on the prints. We do not think they are due to defective fixation, for in none of the prints is there any evidence of prints having lain one or another whilst in the fixing-bath. Usually in a batch of prints where fixing has been done carelessly one can find straight marks where the edges of one print has lain on another. We can only conjecture that apart from defective manufacture the markings are due to the prints having been laid in contact with some impure material. They would be particularly liable to produce these markings if the fixing-bath was not alkaline, as you doubtless know that a self-toning bath if made up with plain hypo becomes acid when the prints are put into it from the acid in the paper. Therefore, as a safeguard against acidity, it is as well to add a little bicarbonate of soda or ordinary washing soda, in order to counteract the acid from the paper. Very often this leads to a warmer tone of print, but it is, on the other hand, a means of greater permanency, and the avoidance of possible markings from subsequent contact with impure material. This is largely in the nature of a conjecture, but your letter seems to suggest that at some stage or other prints have been laid in contact with something.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

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The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

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SUMMARY.

In consequence of the rigid application of the No-Returns Order, it is necessary to place a definite order with an agent or to subscribe direct from this office in order to ensure regular delivery of the ' B.J."

The Professional Photographers' Association, on consideration of the subject of training disabled soldiers and sailors for photographic employment, has issued a non-committal report, although its forecast of after-the-war conditions among photographic assistants decidedly suggests that the supply of trained labour will be in excess of the demand. (P. 282.)

A report of the second meeting of the Edinburgh Society of Professional Photographers contains the names of proprietors of those studios which are co-operating in the scheme for simultaneous closing for a period of ten days. (P. 284.)

A large measure of unanimity among photographers in Sheffield for the simultaneous closing of studios is announced. (P. 287.)

Several prescriptions for make-shift plate backings are given by a contributor to "Assistants' Notes." (P. 283.)

A convenient method of fixing the vignetter for use with a strip printing machine is described by another contributor. (P. 283.)

The vignetter for bromide prints can be made much more satisfactorily by painting with opaque on a piece of celluloid than by cutting serrations out of card, as customary in the days of print-out papers. (P. 278.)

In an article which we reprint from our contemporary, "American Photography," the author, Mr. W. S. Davis, gives detailed instruction in the colouring and tinting of photographs other than portraits by the various methods of aniline dyes, water-colours, etc. In view of the prominence into which coloured or tinted photographs have come of late, this branch of photographic finishing is deserving of photographers' attention. (P. 279.)

The research which is contemplated by the newly-formed British Photographic Research Association is in the pure scientific fondamentals of the photographic industry with a view to its future development rather than to its immediate progress. (P. 278.)

The death is announced in a Scandinavian journal of Herr Rudolf Dührkoop at the age of seventy. (P. 286.)

The pros and cons of various descrintions of hand-camera, in consideration of the requirements of the photographic beginner, form the subject of a discussion at the Croydon Camera Club. (P. 284.)

According to a scientific paper issued by the United States Bureau of Standards, dry-plates colour-sensitised with di-cyanin have been found effective in stellar photo-spectroscopy. (P. 285.)

EX CATHEDRA.

No-Returns Order. With the coming into force of the "No-Returns Order" it will be impossible after Monday next for persons to obtain copies of a newspaper, such as the "British Journal," except by giving a definite order to a newsagent for its regular delivery. Our publishers have for many months past anticipated the Order by refusing to accept returns save in one or two exceptional cases. But the official prohibition of returns will now make this practice absolute, and it is, therefore, necessary that we should caution every reader who wishes to ensure the receipt of his copy of the "British Journal" to take the necessary steps with the agent from whom he regularly obtains it. There is no reason whatever, so far as we are concerned, why an agent should not be able to supply. If he says that he cannot, the alternatives are to transfer the order to somebody who can, or to order the "B.J." to be supplied regularly by post from our publishers. In the latter case copies are posted from this office on Thursday, and should reach most places in the United Kingdom by the first post on Friday morning, or at the latest on Saturday morning.

* * *

Minimum Prices. The various "controls," both as regards quantity and price of many of the necessities of life, have altered most people's ideas with regard to the blessings of unlimited competition. In pre-war times this was usually in the direction of price-cutting, resulting in a lowering of quality both of materials and workmanship, whereby the consumer suffered, while the producer or seller had to work long hours for small profits and sweat his assistants into the bargain. In later times the competition has been in the contrary direction, excessive prices having been paid to those who produced or controlled goods, while the customer has in his turn offered to pay any price in order to get what he wanted, greatly to the detriment of the man whose income has not been swelled by profits made in the same way or by war bonuses. As we may doubt a further increase in the cost of photographic materials, and indeed may hope with the termination of the war to see a considerable reduction of such prices, it would seem that the present would be a favourable time for photographers to try to come to some agreement as to establishing a scale of minimum prices for standard lines of work, much in the same way as the hairdressers have done. In the past, almost from the inception of photography as a business, it has suffered, particularly in the commercial section, from price-cutting. It is now fortunately impossible to make a 12 by 10 negative and supply a print for three shillings and sixpence, and if photographers will only get together, say, through the organisation of the P.P.A., it should be impossible for such prices to obtain in the future. Photographic dealers may not sell plates or many chemicals below a standard price. Chemists owe a great part of their income to the "protection" of nearly all the proprietary articles they sell. Why should photography hesitate to adopt the same idea? In most cases competition in prices is due to the fact that rival photographers are not on speaking terms; they do not have the opportunity of meeting at markets and trade gatherings as do butchers, grocers, and other tradesmen, so that there is no opportunity for discussion of such matters. Local associations in connection with a central body such as the P.P.A. would to a great extent remove this difficulty. Such a system has long been working successfully in America, where co-operative advertising has become quite common, and we are convinced that the same could be done on this side.

* * *

Step Actinometers. The form of actinometer well known to carbon printers consists of a series of overlapping layers of tissue paper; each step is numbered and the intensity of the light is gauged by the time necessary to impress a given number upon a slip of gelatino-chloride paper placed behind it in a printing frame. Such an instrument should find many uses in modern photography, not the least important being the comparison of rapidity of various grades of paper or card. Instead of paper which is liable to discolour by prolonged exposure an ordinary slow negative plate may be used and the gradations obtained by exposing it to a weak light in half-inch strips, doubling the time for each exposure. A very weak light must be used so that an exposure of, say, ten seconds will give a barely perceptible fog, the succeeding steps being 20, 40, 80, 160, and 320 seconds respectively. Development should be effected in the dark with a non-staining developer, amidol being, perhaps, the best, and development carried out fully. Numbers indicating the ratio of exposure should be painted on each step and the whole varnished. If we take two strips of bromide paper, lantern plate, or carbon tissue and expose simultaneously under this graduated plate we can readily read off the relative exposure necessary to get a certain depth of deposit with each. A very narrow strip is sufficient for such a test, and may save a large sheet when enlarging from a fresh packet of paper. Another use would be to compare the actinic value of two lights for enlarging, or even as a rough test for the efficiency of a flashlamp. A quarter-plate is large enough for most purposes, and the actinometer should be kept in a special printing frame with a pad of pure paper in contact with the surface.

* * *

Vignetting Bromide Prints. Vignetting on a developing paper is much more difficult than when P.O.P. is used, as there is no opportunity of watching the printing and shifting the vignetter if it has not been properly placed at first. Moreover, the light used is usually more direct than diffused daylight, so that different treatment is necessary. There is no better way of making vignetters than the American plan of taking a piece of translucent paper and painting upon it with an opaque colour the form of an ordinary serrated vignette. The advantage of this over the ordinary cut-out opening is that the points may be made much longer and thinner, and that there is no danger of their being damaged in use. Such a vignetter must, of course, be attached to a glass, and this is not easy to fix to most printing frames. A little modification removes this defect, and gives a light, tough, and unbreakable vignetter. It is to use an ordinary stout card with a central opening rather larger than the vignette opening, and to cover this with a piece of negative film on which the serrations have been painted. It is quite simple to remove the image from an old film negative by Farmer's or the iodine-cyanide reducer. This is found better than cleaning off the film altogether, as the gelatine takes the colour better than the celluloid does. It is hardly necessary to point out that vignetting is much simplified by using a camera vignetter in the first place; as a general rule vignettes so made will not print with a perfectly white margin and require a card vignetter in the frame, but there is no tendency for the vignette to spread too far in the case of a dark dress or coat. The simplest vignetter of all is one made by photographing an oval patch of black velvet fixed on a white card put very much out of focus. If a slow plate be used, the margin will be quite opaque and the edges beautifully soft. The plate is put in contact with the negative, and straightforward prints made. This is especially useful in printing boxes.

PHOTOGRAPHIC RESEARCH.

The establishment of the Photographic Research Association, inaugurated at the gathering which was reported in our issue of last week, is a small beginning in the photographic industry, but the importance of a new effort of this kind is to be measured by the direction in which it proposes to go rather than in the announcement of an ambitious programme. And for the photographic industry this is, as cannot be too prominently emphasised, a new beginning—new in the sense that it represents an allocation of money and management for the purposes of pure research, and new also in the sense that it represents the combined and co-operative support of those in the photographic industry. We think that as much value may be attached to the one feature as to the other, for while the prime motive of the Association, that of promoting pure research, is the chief consideration, a movement of this kind, in the circumstances of the industry in this country, could hardly be embarked upon with reasonable prospects of success unless with the support, moral as well as financial, of the firms composing the industry. To those who may not realise the strong individualism which characterises the component firms in the photographic trade the project may perhaps seem less of an achievement than it really is, and when it is considered what is the kind of movement which has been set going there should be a still greater degree of satisfaction at the stage which has so far been reached.

The speeches which were made at last week's gathering, inspiring as they were, scarcely defined as sharply as an uninformed person might have wished the scope of the work which is the avowed object of the Association. Research is its keynote, but then research as a descriptive term is capable of several interpretations. The sense in which it is used by the Association was, however, well defined in the address by Mr. Gerald Bishop, who made it clear that the facilities which are to be provided are not for the species of research which, in a more or less scientific way, is carried on at present in every photographic manufactory for the purpose of improving existing products, simplifying and cheapening methods of manufacture and generally for contributing to a firm's manufacturing efficiency. Research of this kind may be said to be a necessity for present progress, and undoubtedly manufacturers could do with more of it, but it stands in a different category from that which is contemplated by the Association. The latter in its plans is thinking not of present progress but of future development; it is casting its bread upon the waters in a spirit of confidence which perhaps may not be quite the counterpart of that embodied in the

Biblical exhortation but, as may be hoped, does not fall very short of it. In other words, the research which it is proposed to establish and endow is not for the immediate benefit of manufacturers, but is intended to consist in pure scientific inquiry into the many fundamental matters which even now after forty years of the gelatine emulsion industry are very partially known. Thus, instead of the investigator seeking to benefit the manufacturers, he will look to the latter for assistance in his work. While bringing to the examination of fundamental problems a scientific training in physics and chemistry, his business, as we understand it, will be to gather all the material facts which he can from manufacturers' experience and in the course of his own experimental work to interpret and corelate them as a means of seeking to throw light upon what are at the present time, in the case of many matters, highly obscure phenomena.

The field is a very wide one: the investigation of it must necessarily be small at first, but it is a good thing, we think, that photographic manufacturers have taken courage in both hands and have not allowed their enthusiasm to be damped by the contrast between the wideness of the field and the smallness of the means which at the outset can be taken to explore it. If one were to wait for an attack upon a scale commensurate with the field, it is perfectly certain that a beginning would never have been made at all. And there is good reason to bear in mind the encouragement of Sir Joseph Thomson not to despise the day of small things. No one better than Professor Thomson is able to appreciate the value which investigation even on a small scale may have in the future. At the same time, it may be hoped that the enlistment of one and another industry in the field of pure scientific research may as time goes on contribute to the advancement of all such efforts. Cooperation among units each representing the research activity of a given industry should be in the direction of realising a scheme of organised research such as was advocated two years ago by Dr. C. E. Kenneth Mees in a paper which appeared in "Nature" of July 13 and 20, 1916. The suggestion was the establishment of a national industrial research laboratory "to assist all British manufacturers, and to develop the theory underlying the great fundamental industries on which British work depends." The very size and comprehensiveness of such a scheme are probably the chief obstacles in realising it at a single step, but perhaps it is not too much to hope, as research is promoted and set going by individual industries, that the day may come when it may be carried on in an institution set apart for the purpose, and in which there would be the opportunity for very great economy of effort in comparison with the prosecution of the same work in different places. Much research work calls for entirely mechanical operations such as photo-micrography, spectrography, section-cutting, and all kinds of physical measurements which obviously could be done more efficiently and economically by technicians making these their special branches of work and rendering their individual service to those engaged in the carrying on of altogether distinct branches of investigation.

COLOURING AND TINTING PRINTS.

[Much excellent advice is contained in the following article by Mr. W. S. Davis from the current issue of "American Photography." It is worth the while of the photographic colourist to pay more consideration than has been done in the past to the colouring of landscape and figure subjects as distinguished from pure portraits to which hitherto the work of the colourist has been in a great measure confined. The interest aroused by the exhibition of large coloured photographs as a means of bringing the scenes and incidents of the war more vividly before the public has, we think, had some considerable effect in the direction of setting a rather greater value upon the coloured photograph—an effect which is likely to have its counterpart in a more widespread use of coloured photographic enlargements and prints for such purposes of publicity as in the past have been satisfied by photographic work in monochrome. This is a point upon which we have already commented, but it may be usefully emphasised again in giving a place in our pages to the very detailed instruction as regards technical manipulation and æsthetic considerations which is contained in Mr. Davis's article.—Eds. "B.J."]

NOTWITHSTANDING the wonderful advances made in true colouring photography, there still exists a field for the use of hand-coloured photographs. A variety of materials is available for doing the work, such as aniline colours or dyes (which form the base of most of the "photo-colours" sold under different trade names), moist water-colours, oil-colours, and pastel crayons. The last-named, though, are not often employed as compared with the others, as they require to be set with a "fixative" to prevent dusting off, and being more or less opaque obscure the details and gradations of a photograph if not very skilfully handled. The moist water-colours used for painting are especially well adapted for use on platinum prints, or any paper free from a heavy gelatine film Aniline dyes, obtainable either in a liquid state or as colour-films in book form, are easier to apply to prints which have a gelatine emulsion coating, which, of course, includes all bromide and gaslight papers. They are likewise commonly chosen now for tinting lantern slides, both because of the ease of application and the clearness of the various transparent colours. Artists oil-colours in tubes, or those put up especially for photo-printing, occupy a place by themselves, and for certain qualities excel all other methods of colouring gelatine emulsions, particularly where great richness of tone is desired. They are also more permanent than many of the aniline dyes when exposed to strong light continuously, though this may not be so important a matter in the case of lantern slides, for while subject to intense light when being shown, the length of time they are thus exposed is relatively short. After a little practice in becoming acquainted with the difference in handling, the oil-colours will be found as easy of application to prints as any other, though more skill is required to preserve perfect transparency, and even tints on a lantern slide. However, there is no reason why a slide tinted with aniline cannot be retouched with oil-colours to increase the richness of half-tones and shadows, when it seems desirable.

Kind of Positive Best for Colouring.

Where a print or slide is made with the final effect in view better results are generally obtained, and a moment's thought will make clear the fact that for tinting purposes it is desirable to keep the general tone of a positive lighter than normal to allow for the deepening of tone which occurs when layers of transparent washes are applied. For this reason the higher lights in a bright subject should be kept as clean as possible without loss of necessary detail, and the deeper tones a shade lighter than usual, as the monochrome photographic image naturally lowers the purity of any transparent colour which is superimposed, and if very dark the effect of the colour is entirely lost.

If aniline dyes are to be used it is better to omit alum or other hardener from the fixing bath, because a very hard film does not take the colour evenly or easily. It is therefore advisable to use either a fresh plain hypo solution, or a simple acid-fixing bath, made by adding a drachm of potassium metabisulphite (or an equivalent amount of acid bisulphite) to every pint of hypo solution, one part hypo to four of water. It is also a good idea to wipe off the surface of a print when removed from the last wash water with a tuft of absorbent cotton to remove particles that sometimes stick to the film.

While the aniline colours can be applied to prints of any surface, a rough or matt surface is preferable. Regular moist water-colours work much better upon a rough surface, for being pigments instead of dyes they do not sink into a gelatine film as deeply, consequently a surface possessing some "tooth" is required to hold them. Oil-colours may be used on any surface, though it is very much easier to work on rough paper.

As a rule a black and white print makes the best foundation on account of its neutral tone, but in exceptional cases a toned image in harmony with the prevailing colour scheme selected will save labour by furnishing a part of the colour required.

When a very pure tint must be preserved in the lightest parts, one may resort to local chemical reduction of the image until such parts are nearly pure white, though any detail or gradation so destroyed will have to be worked in when the colour is applied.

Suggestions upon Colour.

This is such a broad subject that but a few of the main points can be even touched upon in a limited space, and in any event one must go to Nature and study effects to secure first-hand information. However, the very profuseness and changeability of Nature is frequently a source of confusion to a beginner, so as a supplementary means of acquiring a better understanding of colour harmony as applied to pictorial ends it is a useful practice to study good colour-reproductions of works of art, or the originals when possible, analysing the means employed to obtain the various effects.

Whether looking at Nature or a picture, note the dominant or prevailing colour, and whether the feeling of warmth or coolness is conveyed. Having discovered this, look for the contrasting complementary colours, for these will be present in some form if only as components of other tints. However, don't expect to find in Nature any colour in an absolutely pure or "unbroken" state. Some of the most intense colours may at first appear so, but even these are somewhat modified; consequently when different parts are spoken of as being this or that colour, it is in a relative sense.

The painter and three-colour process worker take yellow, red, and blue as their primary working colours, since in a spectroscopically pure form these three by proper combinations are capable of producing all the others. As a matter of fact, absolutely perfect tints in permanent form of all three colours are not available, but artists utilise the principle by working with groups containing several yellows, reds, and blues respectively. While various other colours, such as the secondary group composed of orange (yellow-red), green (yellow-blue), and violet (red-blue) are frequently included in the colour box, they are not essential, and a beginner will learn more quickly the principles of colour combination by working exclusively with those in the primary group.

If any difficulty is experienced in selecting the complementary of any colour, remember this is simply the colour (or colour combination) belonging to the tri-colour group not present in the tint under consideration. For example, pure green being produced by mixing the yellow and blue, the missing third—i.e., red—is the complementary. For the same reason green would be the complementary for red. Yellow and violet are complementaries, and orange and blue to each other.

Greys and browns are mixtures of all three colours, the difference coming from variation in the proportion of each used. When perfectly balanced in a colour sense neutral grey is obtained, which if composed of transparent pigments will range from the palest tone to pure black, according to the degree of concentration. Increasing the proportion of any one colour, or combination of two, causes the grey to assume the hue related to such colour.

A positive colour is lowered in hue by the addition of its complementary, but if overdone the result may look muddy.

To produce a harmonious colour scheme of restful character some one colour should prevail—not, of course, in a crude form, but in varying degrees of intensity as regards both tone and hue. In a sunny summer landscape, for instance, green would usually be the prevailing colour quality, but would vary from warm yellow tones through many combinations of grey green to cool blue-greens in the shadow portions of the foliage. However, to preserve a sense of balance in the colour scheme the other colours of the tri-colour group should be used either singly or in mixture. for as white light contains all colours the tints of Nature are more or less prismatic in character. Look at an open landscape on a clear summer day, and note how the warm yellow-greens are set off against the cool greens in which blue predominates, while a suggestion of red is met with in the hues of tree trunks or fresh earth. Seen towards evening the cool shadow tones of the foliage and other parts are balanced by the pale yellows and pinks in the lower portion of the sky. Thus, not only does Nature preserve balance in the colour effects, but those effects are heightened by the play of complementary colour.

The following points should be kept in mind when colouring photographs:—

Atmosphere subdues both the intensity of hue and depth of tone of all objects as they recede from the observer; therefore the most positive and deepest colours should be used only in the foreground.

The distance takes its general hue from the sky—so when tinting the more distant portions of the subject gradually use more of the colours employed for the sky. Foliage on a bright day might pass from clear yellow-green in the near parts through degrees of grey-green, and finally end with blue-grey in the distance. while wooded hills would take on a tone of violet if very remote, the suddenness of any colour transformation depending upon the state of the atmosphere.

The difference in colour of any part in sunlight and shadow is sometimes overlooked by an untrained observer. The variation increases with the intensity of the illumination, but the rule holds good that when the lights are warm in tone the shadows will be cooler, and vice versa. Perhaps the most extreme example of this may be noted on snow, when the rays of the setting sun turn the lighted parts a golden tone, while shadows cast upon the surface assume a brilliant violet-blue.

Another feature worth noting is that certain colours seem to approach and others recede from the eye—or in other words do not stay on the same plane. The so-called warm colours when used strong (yellow, orange and red) come forward, and the cool ones (blue, violet and blue-green)—retire. Care should for this reason be taken not to use those of the first class too strong in the sky or distance, lest the atmospheric effect be destroyed. By taking advantage of this property possessed by different colours the feeling of perspective in a picture can be greatly increased.

Using Aniline Dyes and Water Colours.

Aniline dyes for tinting are best purchased in a set for ordinary amateur requirements. Whether in the form of colour-films or liquids is entirely a matter of personal choice.

When regular water colours are chosen, they may be obtained in tubes or small china pans, but it is best to purchase them from a reliable dealer in artists' materials to secure a standard make. Some of the cheap colours on the market are muddy in tint and poorly ground. The following assortment is sufficient to meet actual needs. *Yellows*—Indian yellow or gamboge, lemon yellow. *Reds*—Rose madder and vermilion. *Blues*—Cerulean, or cobalt blue, new blue and Prussian blue (also known as Chinese blue). "Snow white" or some other good pigment, may be included for toning up high-lights.

The same kind of brushes are used with either aniline or regular water colours. A supply of camels' hair "pencils" mounted in quills is inexpensive but well suited to the work. These are made in a number of sizes. For applying a flat tint on a large area a "wash brush" is generally used. A flat camels' hair in tin, from ½ to ¾-inch wide, is best for average-sized prints. One or two small sable brushes are convenient for touching up fine details, as they hold their point better in working than the softer camels' hair. Again, let me advise the purchase of these from a good dealer. First-class brushes are the only satisfactory kind, and are the cheapest in the long run. To keep in good condition always rinse well after using, drawing the hair between thumb and fingers until it lies in normal shape, and keep flat in a box to prevent damage to the points.

A china slant or set of colour-saucers is desirable, but a raid upon the household china closet, or other source, will no doubt reveal a substitute. Sheets of clean white blotting-paper, some absorbent cotton, lintless cloth, and a sheet of thick window glass, or a drawing-board, complete the list of accessories.

When using the aniline dyes, first soak the print in clean water until thoroughly limp. Wet one or more pieces of blotting-paper, lay upon the glass or drawing-board (the moisture is retained longer upon the non-absorbent surface of the glass) and place the print on top, pressing into contact and removing surplus water with a dry blotter. If the print has been kept clean the surface is now in condition to take colour evenly, but should any greasy markings be noticed these must be removed by wiping with a wad of cotton moistened with very dilute ammonia water, afterward rinsing in a change or two of clear water.

Have at hand two glasses of water—one for diluting the colours, and the other for washing brushes.

Study the subject and fix upon a definite colour-scheme before commencing work. If one feels doubtful about the effect of any tint when placed over the greys of the photograph try it out on a similar position of some discarded print.

The secret of securing a uniform tint over a large area of light tone lies in using a *very weak* solution of the colour and floating this on freely until the film is saturated. The surplus is then removed by gently rubbing all over the freshly tinted area with a wad of absorbent cotton, previously dipped in water and pressed as dry as possible. This takes up the floating colour and prevents it from drying in streaks or clots, and at the same time some gradation of tone may be secured, if desired, by going over such portions as are to be made lighter several times with the cotton and fresh water. Should the first wash of colour not prove strong enough in tint the process can be repeated any number of times. A flat "wash brush" is generally employed for this part of the work, but the colour can be applied with a good-sized tuft of cotton.

Care must be taken with aniline not to let the colours run where not wanted, as it is nearly impossible to remove them entirely, though if the tint is not too strong, wiping the surface with a wad of cotton wet with dilute ammonia—then blotting off immediately—may sufficiently overcome the trouble.

To blend one tint into another: commence as usual, laying the wash over most of the surface it is to cover, then quickly pass a moist wad of cotton along the edge to be softened, using if necessary fresh water to dilute the tint. With a little practice a wash may thus be made to fade away without showing where it leaves off. The print is next turned around, and the second tint applied in a similar manner, blending it into the first. In this way a sky is tinted, the blue tones of the upper sky being washed in from the top of the picture, and the warm tints started from the horizon.

It is a good plan to use the colours, at least for the first washes, with as little mixing as possible, since a crude tint may be subdued by applying a softer shade over it, whereas it is difficult to overcome the muddy look resulting from too neutral a colour. In following this practice apply the bright warm colours first, when such predominate in the scene—then reduce their intensity, or modify the hues, by introducing cooler tints where required. If sunlit foliage and grass is the main feature, a wash of yellow over the greys of the photograph will give a warm, greenish cast to the lighter parts, and after this wash has soaked in, the half-tones and shadows can be altered by introducing blue, or a mixed green, either washed on or applied in small touches sufficiently separated to allow the yellow to show between. One thus obtains a variety of greens. In the same way a violet-grey tone may be given distant hills, etc., by washing over such parts with some of the blue used in the sky, and afterward passing a delicate wash of red over this. Such tints can, of course be mixed and applied direct, but are apt to lack the variety secured by using separate washes.

All the foregoing instructions apply to the colouring of lantern slides, except that a slide after being soaked to soften the film must be supported in such a manner that it is evenly illuminated from below, while direct light is cut off from its face. A frame similar to a negative retouching desk is usually employed, though it is not difficult to evolve a substitute.

The manipulation of water-colours in their application to prints is in nearly all particulars the same as outlined for aniline dyes, only one must use a little more care when placing one tint over another not to disturb the under layer, since most of the colours being finely ground pigments rather than dyes do not take so firm a hold upon the film, and in consequence are liable to wash up. On this account the film of the print need not be kept as damp while colouring, and it is sometimes advisable to finish the finer details after letting the print dry. All the colours previously mentioned will give sufficiently transparent washes upon prints except the lemon-yellow and vermilion, which are classed among the opaque colours. In a thin wash these are semi-transparent, but it is better to reserve their use until the last, and use where touches of clear colour are needed to brighten or accent some detail Gamboge, or Indian yellow, with either Prussian or new blue, gives a variety of green tones. Rose madder furnishes a good series of tints from the palest pink to full crimson, or a series of violets in combination with new blue or cobalt. Cerulean blue is excellent for a delicate sky tint; cobalt or new blue being employed for the deeper parts. A very delicate wash of vermilion is sometimes used to warm up a grey tone. Vermilion or madder with Indian yellow is good to represent bare earth in the foreground, also for portions of tree trunks and branches in light. Some blue might be added, together with more red, to make a purple-brown, for touching up shadows on earth and tree branches. Vermilion, madder, and either gamboge or Indian yellow will give one a wide range of flesh tints, using vermilion and yellow for the lighter parts, and substituting madder for vermilion, in the shadows. White is used only as a last resort for accenting high-lights, being mixed with colours which are to be rendered opaque. Absolutely opaque tints, while sometimes valuable for securing a pure colour over a grey portion of the photographic image should be used sparingly, however, as they are liable to show too plainly by contrast with the transparent tints.

Using Oil Colours on Prints.

The following instructions apply to regular artists' oil colours, so in case the special photographic oil colours are used instead, any difference noted in the directions which accompany the latter should be followed, though for the most part the handling is similar.

The following will meet ordinary requirements. Zinc white; either zinc, lemon, or chrome yellow; raw sienna; rose madder, or alizarine rose; vermilion; new blue; Prussian or Chinese blue (the names are synonymous); cerulean blue. The lemon yellow, rose madder, and new blue come about as close to being true primary shades as can be found, and it is possible to work with these three only, but the others possess certain points which make it worth while to include them if much work is done.

The prints can be tinted entirely with the transparent colours, or any mixture made more or less opaque by the addition of white, though if the latter method is followed it is advisable to have a rather stronger image to work on.

Several bristle brushes of different sizes and medium-length hair are used, also one or two of sable for details.

Spirits of turpentine and linseed oil are used to thin the colours when this is necessary; being used separately or together, according to the manner in which the film takes the colour. A few drops of "siccatif de Courtrai," or similar drier, can be added to each ounce of medium, or mixed directly with the colours on the palette.

Prints must be quite dry to receive the colours, and in the case of large sizes it is an advantage to mount upon drawing-paper stretched lightly upon a board, or paste upon muslin attached to a stretcher. Smaller prints can with advantage be made on double weight paper, and the finished picture mounted under a cut-out mat.

Mix the colour on a white china slab or dinner-plate so that the tints can be readily seen.

Most of the colour is applied in patches or dabs, and then worked into even tints by stippling with a bristle brush held vertically in the hand. When a large surface, such as a sky or a background, is to be coloured, the necessary tints are laid in their approximate places and then blended by using a dabber. This is made by tying a bunch of cotton in a piece of soft lintless rag (an old handkerchief is good) or chamois, taking care to renew the cloth frequently so as not to spoil the purity of the colours. All the larger portions of a print can be coloured by the use of various sized dabbers, or the finger tips, if desired—only using the small sable brushes for working up details.

Transparent tints should be used over the shadows, and as far as possible over other parts, if the full gradation of the photographic image is to be preserved; but when lighter portions fail to come out with the clearness and brilliancy desired the use of more opaque colour is often very effective, and with care too deep shadows can be softened by the application of a lighter semi-opaque tint. In all cases the colours are worked with as little thinning as possible to prevent running or crawling on the print.

One advantage of oil-colours is the fact that any parts which look unsatisfactory can be wiped off while fresh with a rag moistened with turpentine, while clouds or other portions can be wiped out and the proper tint introduced, instead of being left blank when the larger colour masses are applied.

Using Oil Colours Upon Lantern Slides.

As only the most transparent colours can be used one is more restricted in the selection. In my experience Italian pink proved the best available yellow (it is not pink in spite of its name), while madder lake will give clear pinks and reds. Prussian blue seems to be the most transparent blue to be had for this purpose, and its greenish cast is not so noticeable by artificial light, so is not a serious objection, especially as it can be sufficiently neutralised by adding a very little madder. Clearer tints of orange, green and violet are obtained by combinations of primary colours than I have been able to find ready mixed. At first it is best to colour the slides by similar light to that used for showing them, until one learns to allow for the difference in effect between artificial and daylight.

Owing to the small area of a slide and its smooth surface soft brushes are needed to lay the colours, sables' and camels' hair being best. Turpentine containing a few drops of drier per ounce is the best medium, when any is needed.

A soft finger tip, when skilfully used, makes the best possible "dabber" for blending and smoothing tints upon the larger spaces. A piece of very soft chamois or old kid drawn tightly over the finger is also used. Good stipplers for small parts of the work are made by taking medium-sized camels' hair pencils and covering about half the length of the hair from the quill out with tightly wound thread.

From the foregoing one should not take it for granted, however, that all parts of a slide are thus finished, as stippling or blending is only resorted to when a smooth tint cannot be laid direct. The sharper details, in particular, are always worked up with clean brush strokes.

Plenty of time should be allowed for drying before masking and binding, and if the mask is thin it is well to insert a strip of heavy paper at each end, insuring sufficient separation of the cover-glass to prevent its touching the paint; and, above all else, avoid dust at any stage of the work.

The brushes used in oil-colour should be rinsed promptly in turpentine after the day's work is finished, and then in warm-soap-suds and clear water before putting away. Don't try to save left-over colour on the palette—mix fresh tints as needed.

William S. Davis.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

Report on the Training of Disabled Soldiers and Sailors for Photographic Employment.

The following is the report of the council on the resolution passed at the annual general meeting "That the council be requested to consider the practicability of training and employing disabled soldiers and sailors as photographic workers, and to make a report."

Reading the resolution literally, it is clear that many forms of disablement would not materially affect those who suffer from them as photographic workers. We take it, however, that the real question we are asked to consider and report upon is whether, in the interests of those unfortunate sufferers whom it is the intention to serve, it will be wise to encourage the idea that after a short training any one of ordinary capacity would be able to acquire sufficient photographic knowledge and skill to provide the means of livelihood.

In considering the prospects of remunerative employment in photographic businesses of any large increase of photographic workers, the following facts as to the position of photography in the past and its probable developments in the future must be regarded as important.

Except in cases of exceptional ability, photographic assistants in normal times have not been a well-paid class.

As the number of photographic businesses is small in proportion to the population, except in the very large towns, an assistant having to seek a fresh situation is unlikely to find a vacancy in the same district, and in many cases could only find suitable employment at a far distance. This is a serious matter to a man with a family.

Female labour, until late years, has not been employed to any extent in the strictly photographic departments of photographic businesses. Much of this work is, however, quite suitable for women. During the war female labour has necessarily been employed for the work previously performed by those male assistants who have now been called up. A large class of well-trained women photographers has thus been created capable of commanding good wages who are not likely to wish to relinquish their positions and go into other trades.

It is notorious that for national purposes particularly in the Royal

Air Force, a large number, probably amounting to thousands of men, have been employed in photographic work. It is certain that the number is largely in excess of those who have had to leave photographic work for army service. Those who were not photographers before joining up have necessarily received a training in some branch of photography. Those who were photographers will naturally wish to return to the business, and it is more than probable that a considerable proportion of those who have acquired photographic skill while in the service will desire to join the ranks of photography on their discharge rather than return to their old trades.

The present demand for photographic portraits is abnormal, and arises directly from war conditions.

Whatever the loss from deaths and casualties during service of those who were originally photographers it is quite certain that, after the war, there will be more photographic workers than before the war. Whether this increased number, or even as many as in normal times, will be able to find employment after the war is entirely dependent upon the state of photography as a business in the period that succeeds peace. This is an economic problem to which we are not capable of finding the solution, and we are, therefore, in no better position to form an opinion as to the desirability of further adding to the number of photographic workers by training disabled soldiers and sailors in photography than may be formed by anyone who is competent to weigh the ascertained facts of the case.

June 14, 1918. ALEXANDER MACKIE, Hon. Secretary.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Makeshift Plate Backings.

It sometimes happens that a backed plate is required for some exceptional subject, and, the supply of the particular brand or size wanted being out of stock, some substitute must be found. The commercial backing, while in every way satisfactory, is not in daily use, and probably will not be to hand when wanted. I have made use of the following very simple preventives of reflection from the back of the plate:—One of the best simple backings that I have found consists of a little whitening moistened with ink. A mere trace is dusted out in a tiny heap on an old glass negative, and a fragment of rag is moistened with ordinary black ink. This is dipped in the powder and rubbed over the back of the plate. This backing has the advantage that a light rub with a cloth will remove it prior to development. On another occasion I successfully used ordinary brown boot polish lightly dabbed on; and on still another, a lump of "Plasticine" was employed. This was well rubbed over the glass side of the plate, and made quite an efficient backing. Many photographers do not seem to realise the real value of a backed plate for producing bright negatives, and by this I refer to ordinary plates. If one of the anti-screen type is employed it will be found to be practically non-halative, even when unbacked; but in the case of a difficult subject, or one containing any brilliant lights and extreme darks, the simple precautionary devices noted above are of value. One word of warning may be added: and that is that, though not absolutely essential, it is always advisable to remove any of these extemporised backings before the plate is put into the developer. This only takes a minute or so, and is a complete preventive of any mishaps.—EXPERT.

A Handy and Quick Vignette.

I RECENTLY met a bromide worker who had trouble in vignetting when using a strip machine. The actual complaint was that it took as long to print six vignetted strips as it did to do two or three dozen solids. I was asked did I know of any method of vignetting that would save some of this lost time, and as I was fortunate enough to be able to render a little useful assistance, I am describing the idea for the benefit of any reader so troubled.

The machine used had no slot for sliding and adjusting vignettes. A later model of the same machine has an adjustable vignette with it, but these useful articles cannot be used on any other model, and the printer is often reduced to fixing pieces of cardboard and tissue paper under the negatives, a process which is slow and difficult if perfection is aimed at.

On some strip machines midway between the diffusing screen and the negative mask are two strips of beading; if these are absent, tacks or drawing pins can be pushed into the sides of the box to take their place. A piece of thin wood is cut to fit the box closely at this point, and the beadings or tacks should support it.

In this piece of wood an elliptical opening is cut, measuring 5 in. × 3 in. It must be so placed that when the wood and the negative are in position the hole is directly below the negative. This may or may not be in the centre of the wooden rectangle.

Three old negatives are cleaned off, and the glasses cut down to 6 in. × 4 in. On one, just a trifle out of centre, is painted a vignette, about 3 in. × 2 in., with Photopake or Indian-red watercolour. The edges can be softened a little by dabbing. Another is done, making the opening 3½ in. × 1½ in., and the third is made 4 in. × 1 in. These should be varnished.

When a negative is to be vignetted, the wooden frame is dropped on to the supports midway between diffuser and negative mask, and the suitable vignette placed upon it. It is a matter of seconds to get correct adjustment, and no tissue is necessary. The three sizes will cover quite a multitude of different negatives, giving very soft edges, and seeming to agree with all sorts of backgrounds. By doing away with the necessity of tissue, time is saved in fixing the vignette, and also in exposing.—THERMIT.

New Materials, &c.

Rapid Panchromatic Plates. Made by Ilford, Ltd., Ilford, London, E.

A MOST notable advance in the manufacture of colour-sensitive plates is embodied in a new and improved grade of their panchromatic plate which has just been put upon the market by Messrs. Ilford, Ltd. The new plate, for such it deserves to be called, represents an advance in two respects, namely, speed, and evenness of colour-sensitiveness throughout the spectrum. We have made exposures in the spectrograph and through a set of three-colour filters, and both forms of test have shown the remarkable success which has attended the manufacturers' aim at securing a much higher degree of perfection in the two qualities which, in conjunction with range of gradation, etc., determine the value of a panchromatic plate. Exposed in the spectrum without any screen the plate records a band of density from the ultra violet to the red end of the visible spectrum, practically even throughout and unmarked by gaps. Exposed through a set of the three-colour filters ordinarily employed in the making of colour-sensation negatives for photo-engraving the plate yielded a negative exhibiting a slight degree of overlap between the green and the blue, practically continuous from the green to the red and this with a ratio of exposures in the proportion of: red 4, green 5 and blue 4. These were the ratios indicated on the slip enclosed with the box of plates, and their adoption showed that they correctly represent the performance of the particular batch. At the same time comparison with the previous grade of the Ilford panchromatic showed that the actual exposures required by the new plate were from one-third to one quarter.

It is therefore evident from the results of these tests that the makers have united in a plate of otherwise excellent quality a very much greater general speed and individual colour-sensitiveness which roughly may be taken to be the same throughout the spectrum, or perhaps we should say to differ from this latter only in requiring a slightly greater degree of exposure in the green. Thus it is not surprising to find that, employed in the camera without any compensating light-filter, the plates afford a degree of colour-correction which is sufficient for a very large proportion of the subjects ordinarily calling for a screened plate. The pictorialist will value this quality, and all the more in that the general speed of the plate is sufficient for shutter exposures with a hand camera even when a light-filter is used. For it must be remembered that in the case of a plate possessing such evenness of colour-sensitiveness the prolongation of exposure by a yellow screen is much less than in the case of a plate the range of colour-sensitiveness of which is more restricted. On all these accounts it is not too much to pronounce the new Ilford plate as the most perfect example of highly sensitive panchromatic material which can be obtained. It will doubtless find numerous applications, not only in the vitally important work of aerial photography but for the industrial purposes of three-colour photo-engraving and in the scientific fields of spectrography.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, June 22.

South London Photographic Society. Excursion to Kew Gardens.
Manchester Amateur Photographic Society. Outing to Belle Vue.

Tuesday, June 25.

Manchester Amateur Photographic Society. "The Elements of Pictorial Composition for Beginners." H. Cadness.

CROYDON CAMERA CLUB.

Debate is good for the soul of photographic societies, especially if the subject permits all to contribute. This was the case last week with a discussion on hand cameras opened by Mr. E. A. Salt. Considering the number of hand cameras on a pre-war market, designed for varied conditions at various prices, no attempt to achieve the impossible was attempted by placing any particular type first. But by common consent the reflex was accorded the premier position for pictorial, portrait, and group work. Nevertheless, it was felt that its bulk, weight, and conspicuousness told heavily against it when on a holiday jaunt, even if its price tended to lighten the pocket.

It was generally agreed that box-form hand cameras were the easiest to manipulate and more certain in results than most folding types, the latter occasionally recording things not on the straight. Circular levels (often provided to correct this tendency) were unanimously regarded as a device of the devil when fitted to a hand camera. The magazine type, with plates in sheaths dropping to the bottom of the camera, found no advocates; the box-form, fitted with changing-box, met with favour; but the majority placed plate-holders as well ahead of all methods for changing plates. Opinions varied as to the merits of a rising front in hand cameras, most thinking this adjustment of great utility, though all agreed that with midget cameras its absence was never felt. Why this should be so no one could explain.

These tiny cameras, taking 4.5 x 6 c.m. films or plates, or thereabouts, were not considered in the running, except in cases where portability was the chief thing, though it was admitted that many negatives of this size enlarged wonderfully well; but every one demanded enlargement, which was a distinct nuisance. On the other hand, it was pointed out that manipulating a fixed-focus enlarger was almost as simple as making contact prints, but apparently only one member possessed such an enlarger; and, after all, it is horribly amateurish, even if it be extremely useful. With midget film cameras the frequent absence of rollers for a bearing surface for the film was severely commented upon as an unnecessary sacrifice to save a very small space and a small additional cost in construction. Scratches on these little films are certainly serious, and the travel of a taut film over a stationary surface must tend to produce them.

As regards size of plates, the 3½ x 2½ appeared to be rapidly growing in favour. Direct prints could be seen without a magnifying-glass, and the proportion of length to breadth was good. Viewfinders also received attention, and the brilliant form (almost compulsory with small folding cameras) did not secure unqualified praise. Surface reflections were often troublesome, and it was said many gave a different perspective from that rendered by the lens, and some a different point of view according to the position of the eyes. A few advanced a vigorous plea for the old ground-glass finder, though usually the lens was too small and the ground-glass too coarse. The method advocated by Mr. Chapman Jones of reflecting by a mirror the ground-glass image was mentioned as being far better than employing the mirror to reflect the image-forming light on to the ground glass. Although no direct comparison was made between plates and films, an ancient prejudice against the latter appears to have died at last. Indeed, some affirmed that on an average films gave better printing negatives than plates.

The foregoing summarises a few of the many points discussed which may be considered general in character. The opener of the debate raised a special point in reference to the best camera for all-round work for the use of a beginner willing to spend somewhere in the region of a five-pound note. He had been frequently asked to advise, and had experienced great difficulty in doing so. In his opinion the almost obsolete type of focussing box hand camera, fitted with plate-holders and focussing scale and focussing screen, if brought up-to-date, would be ideal. It made a good ever-ready hand camera, and a fair substitute for a bellows camera for portrait, group, and landscape work. Beginners always wanted to take portraits, and finders truly adjusted for "infinity" were most deceptive when it came to such close distances as one yard, owing to parallax in two directions, and also to the finder showing more than was recorded by the plate. A focussing 3½ x 3½ box-form roll-film camera would also be well adapted for beginners. Here the finder being placed just over the lens, parallax only occurred in one direction, and it would be a simple matter to fit a sliding piece with apertures to show the identical view when the scale was set to one or two very near distances. The question of registering finders for quite near objects was of real importance, and if effected it greatly extended the scope of focussing-by-scale cameras. This view and the commercial view-point, however, did not necessarily coincide.

Mr. J. Keane preferred the type of bag changer, where the plate, after exposure, was lifted from the front and dropped to the back. If, before exposure, the plate was transferred from back to front, any dust adhering in its passage would be recorded. The ideal camera of the future, he thought, would be the folding reflex. Mr. J. M. Sellors showed various hand cameras, including a reflex, of his own design and manufacture, and very well made and designed they were. In one the plate-holders rose and fell instead of the front, a system having some constructional advantages. Mr. Walker advocated a blue glass finder as giving a good monochromatic rendering; he had used one with satisfaction. Depth-of-field focussing scales he had also found useful. The President (Mr. A. F. Catharine) said the evening had been most instructive, and, of course, more or less futile, for most worked on different lines and were bound to differ in opinion. He agreed with Mr. Salt's remarks on cameras for beginners. For general hand camera work, in his opinion, the strong points of a reflex camera were more than counterbalanced by its great weight and bulk.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

The second meeting of the Edinburgh Society of Professional Photographers was held on Monday, June 10, at Messrs. Moffat's Studio, 125, Princes Street. Letters were read from four firms with reference to the holiday closing scheme, intimating their inability to cooperate. Mr. Coltart then pointed out a matter which had not been brought up at the previous meeting—namely, the fact that the particular ten days which had been arranged during which photographers would close their premises included two Saturdays, and was thus an additional hardship to those for whom Saturday afternoon was the most remunerative portion of the week. Mr. Coltart asked if the ten days in question could not now be altered slightly so as to include only one Saturday, for those who desired it. This matter was then discussed, but it was pointed out that as every detail had been definitely settled at the previous meeting it would, even if possible, be very unwise to tamper with the arrangements already agreed upon by the majority. Sympathy was expressed for those who would thus be adversely affected, and it was suggested that this point should be kept in view on any future occasion.

The following are the names of those firms who, up to the present, have intimated their intention to co-operate in the closing scheme:—

Miss Anderson, Princes Street.
Mr. Ayton, Bruntsfield Place.
Messrs. Jas. Bacon and Sons, Princes Street.
Mr. Bambrick, Hanover Street.
Mr. Balmain, Shandwick Place and Salisbury Place.
Mr. Barrie, 4, W. Maitland Street and Princes Street.
Miss Bertram, Rose Street.

Mr. Coltart, Dalmeny Street, Leith.
Mr. Wm. Crooke, Princes Street.
Miss D'Arcy, Queensferry Street.
Mr. Campbell Harper, Leith Walk.
Mr. Claude Lauder, Gayfield Place.
Messrs. MacAlpine and Son, Greenside Place.
Mr. Mackay, North Bridge and Leith Walk.
Messrs. John Moffat, Princes Street.
Mr. E. W. Parken, 22, Dalry Road.
Miss Pirie, Comiston Road.
Mr. Alex. Roberts, Piershill Studio.
Mr. Ross, Raeburn Place.
Mr. Drummond Shields, Lauriston Place.
Messrs. Thomson Bros., 5, W. Maitland Street.
Mr. A. Swan Watson, Bruntsfield Links.
Messrs. E. R. Yerbury and Son, Morningside Road.
Messrs. Drummond, Young, and Watson, George Street.

With further reference to the holiday question, Mr. Barrie suggested that a bill or poster—more or less a reproduction of the combined advertisement—should be printed, and would be used by photographers to fix to their doors or cases during the period for which their premises were closed. It was also suggested that a postcard should be printed, bearing the name of the society as a heading, and on which would be printed an intimation of the co-operative closing, with an additional note to the effect that the letter or communication would receive attention immediately on the resumption of business. This card the photographer would use as a convenient means of reply to all correspondence forwarded to him while on holiday. Both these matters were entrusted to the care of the committee.

The Secretary then reported on the decisions of the Committee regarding the constitution of the Society, and the rules which they had drawn up were read and approved. It was decided that the subscription should meantime be 5s. annually. The desirability of renting permanently a room or rooms in some central position was pointed out, and probable costs were quoted. It was the feeling of the meeting, however, that such a venture would not be wise at the present time. It was further decided that the Society should meet on the first Monday of each month, excluding July, August, and September, and the meeting in December should be of a social nature. The committee would be responsible for the arrangement of a series of varied and interesting meetings to be held throughout the year 1918-19, and a syllabus of these would be issued to the members.

Before the conclusion of the meeting a discussion took place with reference to the proposed co-operative plate factory, and regarding the circular just received by a number of those present requesting photographers to purchase shares. It was felt by the meeting that the project was laudable, but that the information given was scanty, and the Secretary was instructed to communicate with those connected with the scheme with a view to obtaining more useful particulars.

Commercial & Legal Intelligence.

NEW COMPANIES.

British Scientific Instrument Research Association (word limited omitted from title by licence of the Board of Trade).—Registered May 30 as a company limited by guarantee, not formed for profit, with 100 members, each liable for £5 in the event of winding-up. To promote research and other scientific work in connection with the British optical and scientific instrument trade, etc. Pending election of first council, management is vested in the subscribers to the memorandum of association, viz.:—Messrs. C. Beck, 68, Cornhill, E.C.; M. W. Zambra, 38, Holborn Viaduct, E.C.; H. J. S. Stobart, Glass Works, Smethwick; W. R. Ottway, Orion Works, Ealing, W.; A. Hughes, 59, Fenchurch Street, E.C.; G. W. Heath, New Eltham, S.E.; F. C. Watts, 123, Camberwell Road, S.E.; R. S. Whipple, Cambridge Scientific Instrument Co., Cambridge; and J. Hasselkus, 3, North Side, Clapham Common, S.W. Registered office: 6, Moorgate Street, London, E.C.

News and Notes.

The Photographic Convention.—There will be a meeting of members at Kew Gardens on Friday, July 5; the secretaries are now busy arranging details.

Tribunal Appeals.—At Horsham Urban Tribunal, Mr. Eager applied for a photographer of forty-three, fit for general service, and who carries on two businesses. It was decided he should not be called up for three months.

An Optician's Will.—Among the latest wills is the following:—Mr. Frederic George Phillips, Charterhouse Street, London, E.C., optician, £31,785. Mr. Phillips was the London agent for Voigtlander lenses.

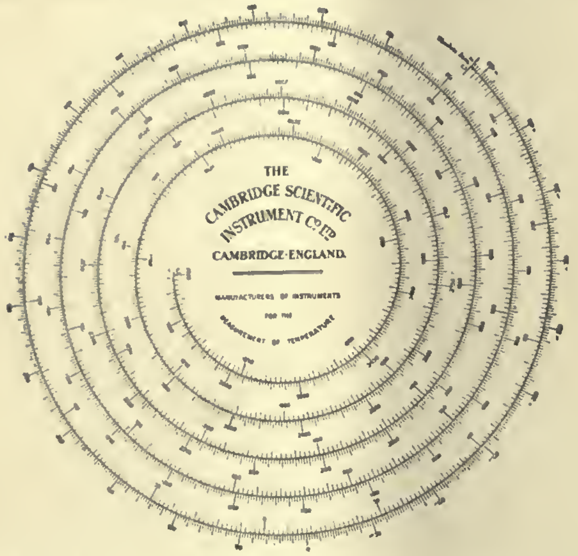
Prohibition of Photography.—At Lincoln last week, Robert Horner, 38, West Parade, was summoned for unlawfully having in his possession, without authority or excuse, a photographic apparatus, contrary to Regulation 19 of the Defence of the Realm Regulations, on May 28.—Mr. S. Bell, J.P. (a special constable), said he was going along Brayford Wharf, and saw defendant taking a photograph of a baker's horse and cart in front of the Co-operative Slaughterhouse.—The Chief Constable pointed out that it was necessary in these days to obtain a permit even to carry a camera. —A fine of 7s. 6d. was imposed.

The Amateur Photographer and Photography.—The first issue of our contemporary, which now represents the amalgamation of the "Amateur Photographer" and "Photography and Focus" reaches us just as we go to press. We note the announcement of Mr. F. J. Mortimer as its art editor. While its style of typography remains that of "Photography and Focus," a number of the features which characterised the "Amateur Photographer" appear in its pages, among them the table of exposures for the month, the notes of society doings, the hints on the home manufacture of photographic apparatus, and the four-page supplement of reproductions of selected photographs. This list still leaves room in the combined journal for the features of "Photography" which have hitherto been customary, such as the Walrus's page of "Pifflo," the critical notes by the "Bandit," the weekly criticism of a reproduced picture and the instalment of the chapters of practical lessons for beginners. In its enlarged form our contemporary should surely make a strong appeal to amateur photographers of all classes.

The Application of Dicyanin to Stellar Photo-Spectroscopy.—The U.S. Bureau of Standards has had considerable success in photographing extreme red and infra-red radiations by means of commercial plates sensitised with dicyanin. This article describes the application of such plates to stellar spectroscopy. The observations were carried out at the Harvard College Observatory, using the 24-in. reflecting telescope and objective prism. Fraunhofer's A band (wave-length 0.760μ) and a considerable region of greater wave-length were photographed in numerous stellar spectra. Several new absorption flutings were discovered, the most striking beginning at 0.760μ, nearly coincident with A, and running toward the red. Circumstances indicated that this band might be due to titanium oxide, and experiments since made at the Bureau of Standards have shown a band in this position in the spectrum of the titanium arc. The greatest wave-lengths observed in stellar spectra appear, by extrapolation, to be about 0.87μ. The general conclusions arrived at are as follows:—

1. Many stellar spectra possess sufficient intensity in the region of wave-length 0.80μ to enable this portion of the spectrum to be photographed on plates sensitised with dicyanin.
2. In favourable instances stellar spectra can be well observed to wave-length 0.85μ.
3. The region of greater wave-length than 0.70μ contains features of importance, especially in the case of the later spectral types.—Abstract of U.S. Bureau of Standards Scientific paper No. 318.

A Temperature Conversion Chart.—A chart, the usefulness of which will be appreciated by all those having occasion to convert from Centigrade to Fahrenheit degrees and vice versa, has just been prepared by the Cambridge Scientific Instrument Company, Limited, Cambridge, in the form of a spiral curve, on one side of which Fahrenheit degrees are marked in black whilst on the other side the corresponding Centigrade degrees are marked in red. The form of the scale allows of an extremely long range of temperatures, namely, from absolute zero (—273 degrees C.) to 2,000 degrees C. In addition the chart, which is printed on a stout varnished board, measuring 14 by 12 inches, bears tables of melting and boiling points for a large number of substances, together with data as to the temperature of saturated steam at various pressures, specific heats, density of water at various temperatures, and thermal conductivities of metals and other substances. One of the charts will be sent to anyone interested on remitting sixpence, to cover postage, to the Cambridge Scientific Instrument Company.



Death of Herr Rudolph Dührkoop.—News reaches us through the Norwegian photographic journal "Nordisk Tidskrift för Fotografi" of the death in Hamburg on April 3, in his seventieth year, of Herr Rudolph Dührkoop, probably the most notable pioneer in Germany of individual and artistic portraiture by means of photography, and almost the only photographer of German nationality whose work was well known and widely appreciated in this country.

The obituary notice in our Norwegian contemporary, a translation of which we owe to Mr. J. C. Warburg, runs as follows:—

"Dührkoop, originally a merchant, dedicated himself as a young man to photography as an amateur at an epoch when dry-plates and ready-prepared paper were not to be had, and when amateur photography demanded a very different and much more thorough technical training than it nowadays requires.

"His great interest in photography led him, when thirty-four years of age, to choose photography as his life work, and thus, as in so many cases amongst our best-known photographers, his professional work developed upon an amateur basis.

"The name of Rudolf Dührkoop is firmly connected with the development of modern photography, and he was one of those who from the beginning fought against routine and conservatism when pictorial photography had not yet won esteem and consideration.

"His photographic activity was not confined alone to the production of noteworthy pictures, for he also worked for the claims of his craft and the advantage of his fellow craftsmen through lectures and writings. Dührkoop's artistic endowments and his great powers of work were clearly shown at the many exhibitions in which he took part, and from which he bore home high awards and recognition.

"The many reproductions of Dührkoop's work in numberless newspapers made his name known to very wide circles, and he will always be remembered as a noteworthy man, who had the will, the power, and the capability of leading his profession."

Dührkoop was in many ways a remarkable personality. It was not until towards middle life that he took up photography as a business. His youth was passed, like that of many others in his native town, in the counting-houses of Hamburg. During the Franco-German war he served as a soldier, and his first acquaintance with Paris was on his entering it as a private in the German army after its capitulation. For some years after this he was still engaged in retail commercial business, but at about the age of thirty-five established himself as a professional photographer, and for some years produced nothing but the ordinary type of commercial portrait. Then, with a suddenness which was characteristic of his temperament, he took up an entirely different style of portraiture, in which his strong individuality asserted itself, and in which he renounced the use of the customary studio lighting for the effects obtained in a lofty room provided only with a high side-light. Subsequently a set of studio premises in the Hamburger Hof, one of the immense buildings facing the Alster See, was designed on these lines, and here Dührkoop founded a very great reputation and an extensive business among the civic and other leading personages of Hamburg. With the assistance of his daughter, Frau Diez-Dührkoop, a studio was also established in Unter-den-Linden, Berlin, and from about the year 1905 Dührkoop was accepted as probably the leading exponent of pictorial photography, as applied to portraiture, in Germany, whilst the work which he contributed largely to photographic exhibitions in this country received many awards. The first representative collection of it was shown at the offices of the "British Journal," in April-May, 1906, but the most comprehensive collection of Dührkoop's portraits was that which formed one of the house exhibitions at the Royal Photographic Society in 1909, when it was the subject of a eulogistic address upon Dührkoop's career and aims by his compatriot Mr. E. O. Hoppe—we say "compatriot" in reference to this time, since Mr. Hoppe took out papers of naturalisation in this country some three years later.

Of Dührkoop during the war we have heard nothing beyond the quotation of a letter from him in one of the American photographic papers towards the end of 1914 or the beginning of 1915, the tenor of which, speaking from memory, was a prophecy to his good American friends of the speedy triumph of the German arms over the Entente European powers.

Correspondence.

** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

** *We do not undertake responsibility for the opinions expressed by our correspondents.*

FIXING PRINTS WITHOUT HYPO.

To the Editors.

Gentlemen,—After reading Mr. Kidd's deeply interesting experiments on fixing without hypo, I thought I might, with your permission, answer one question he very pointedly puts in the first part of his paper: "Will the result be a very stable print?" I fear not, because sulphocyanide of potassium is a more powerful solvent of silver chloride than bromide and I would not risk a print from either without a hypo fixing bath.

After thirty years of work and observation I find that the old carbonate of soda and gold bath yielded very stable prints. So also does the borax bath. So also P.O.P. with sulphocyanide and gold, even though washed in a burn with leaves and sand, I have found very stable after thirty years.

A simple fixing bath of hypo and sulphite of soda with ordinary washing has yielded prints on bromide paper after many years as stable and fresh as any I have seen.

In practice we all know that chloride works well with all acid, but if a trace of acid is left on the finished print it will ultimately fade out.

Peroxide of hydrogen (or acid gas) in a gelatine plate does not oxidize the silver, for we have proved that after complete desiccation a dry plate of silver bromide works even clearer than an ordinary plate.

Then I have to point out bromide at 1s. an oz. is not quite a practical change even with hypo at 1s. a pound. What is really wanted for the profession in these days of fine bromide paper is a toning bath for P.O.P. in one operation. And a simple hypo and salt for a finish—that line of research will yield a system that will be valuable to the man who wishes to turn out P.O.P. prints that will be stable and with speed and profit.—I am, gentlemen, yours faithfully, Henry Holman.

Banff, N.B.

CO-OPERATIVE CLOSING OF SHEFFIELD STUDIOS.

To the Editors.

Gentlemen,—A very representative meeting of Sheffield professional photographers took place on June 11 at Stephenson's Café, Sheffield, to discuss the question of simultaneous closing of premises for the annual holidays. Practically all the principal photographers agreed to close, with one notable exception—viz., that of a large Manchester firm with a branch in Sheffield. This dissentient has been written to with a view to a reconsideration of the proposition, and the matter stands pending a reply. It was unanimously decided to form a local association to be affiliated to the P.P.A., and a further meeting will be held shortly to appoint officers and adopt rules, etc.

The writer was appointed secretary (*pro tem.*).—Faithfully yours,
G. E. Markcrow.

137, Pinstone Street, Sheffield.

THE USE OF THE BEE METER.

To the Editors.

Gentlemen,—In your issue of April 19, which I have just received (May 18) in Philadelphia, I note a letter from Mr. Oliver Horton, under date of April 13, about my Bee Meter article, which appeared the day before in "B.J."

Your correspondent has probably read my article too hastily and written his letter overnight, for he is in error in stating that I "missed the main point that Mr. Watkins surely makes perfectly plain, that is, 'test the light that falls on the subject.'"

Such instructions would be altogether too indefinite, indeed, and it is not the method in full, as advised by Mr. Watkins. Reference to the Bee Booklet or the Manual will show the following, as printed in my article:—"Test the light which is actually illuminating the *shadiest* (the italics are mine) part of the subject to be photographed. . . . The light which falls upon the *worst lighted* (again the italics are mine) part of the subject in which detail is required in the negative is that to be tested."

In the next to the last line of the second column of my article of April 12, page 170, the types made me say "most" for "worst." On page 171, sixth line from the bottom, the word "necessarily" should have been printed "unnecessarily." In the twenty-sixth line, first column, page 172, the word "stops" should have been "steps." Further down the column the word "mutually" should have been "mentally." These errors were grave, but, being engaged in newspaper work myself (not as a photographer), I know that proof-readers are not infallible.

Upon noting the error I immediately wrote to the Editors, and called their attention to them, but inasmuch as, at this writing, I do not know whether my letter is in their hands or in Davy Jones's locker, I repeat them here.

Mr. Horton's explanation of his method of using the Bee Meter is not quite clear to me unless I substitute the word "should" where he uses the word "will." Even then he would not be following Mr. Watkins's instructions to "test the light which is actually illuminating the *shadiest* part of the subject to be photographed."

Assume that the subject is a porch house with the sun shining on the front and one side, that the camera is placed to photograph the front fully and the *shadow* side partially, and that detail is wanted under the porch and in the shadow side. You easily see that by Mr. Horton's method (as I understand it) of holding the meter at the subject and facing the camera, he would not be following Mr. Watkins's instructions of testing the light illuminating the *shadiest* part," etc.

He forther states that "Mr. Bitter refers to his having been stung. It is a habit of bees to sting when mishandled," *etc.* Quite true. And that is exactly what I had been doing "when I first began to use the Bee." But your correspondent has evidently overlooked a following statement in which I speak of it as an "inseparable companion." It is, indeed, the most valuable and indispensable of my photographic accessories, and I, and thousands of others, am most grateful to Mr. Watkins, not only for this, but his many other original methods for making exposure and development more exact procedures.

Not the least valuable of the Bee Meter equipment is the Steadiest sensitive disc, which, indeed, is most appropriately named.

I regret that anyone should have read my article so hastily or in such a spirit as to feel that it was one of "censure." Surely its whole intent was to promote the use of the Bee, which I have chosen out of many tried for my own use.

My statement that the Bee, when used according to the book of instructions, indicates unnecessarily long exposures with up-to-date shutter equipment seems to be corroborated by such well-known workers as Dr. Malcolm Dean Miller and Frank R. Fraprie, F.R.P.S., who have both stated, in print, that they find one-half of the indicated exposure quite sufficient for the production of a good, normal negative.

Mr. Fraprie is the most valiant champion of Mr. Watkins in America, and surely no thoughtful person would accuse him of "censuring" Mr. Watkins.

Mr. Horton may *believe* that he is giving the exposures as indicated by his method of using the Bee, but does he know that he is? *Has he tested his shutter speeds by a reliable instrument?* I have one shutter made by one of the leading shutter-makers in America, and yet I find that the 1-100 speed gives actually 1-50, the 1-25 gives actually 1-16, the 1-10 is accurate, and the 1-5 gives 1-8 to 1-7.

If anyone has a personal method of using the Bee, with satisfactory results to himself, I would not even suggest that he try mine. Stop making experiments—make more pictures, concentrate on developing your artistic instincts, selection, composition, expression, etc.—Cordially yours,
Milton M. Bitter.

2012, Corn Street, Philadelphia (Pa.), May 15, 1918.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

A. B.—The letter containing a reply to your query has been returned to us by the Post Office marked "gone away." If you will send an address which will find you we will re-post it.

T. F. D.—We have no intelligence of the incident. The only way in which you could obtain details would be by going to the files of the local newspaper at the office or possibly at the Birmingham Central Library.

Research.—We think that the paper by Professor Joly on the latent image to which you refer is that read before the Dublin meeting of the Photographic Convention, and published in the "B.J." of July 14, 1905.

Perplexed.—The black is a secret composition. Although its effectiveness was demonstrated at the R.P.S., the formula was not published. You can get it from Messrs. E. B. Fry, 110, Pratt Street, Great College Street, London, N.W.1.

X.—1. Equal. 2. Say £1. 3. Not enough to make any appreciable difference. 4a. Practically no difference. If any, the *f*/8 would be better at *f*/8. 4b. Impossible to put a value on an unknown make of lens. 5. No difference that we are aware of.

W. E. W.—There are a number of treatises on X-ray work, but most of them deal with the subject chiefly from either the medical or the electrical standpoint. On the whole, the best general textbook is that of "X-Rays," by G. W. C. Kaye, published by Longmans, price 5s.

Bromide.—We should say, from the description, that the lens is capable of giving a sharp picture, and that the fault is that the glasses have been misplaced. We have an article in type on placing the glasses correctly, the directions in which, together with diagrams, should enable you to remedy the defect.

G. L. W.—There is no means for remedying a negative which has developed stains of the kind shown through intensification with mercury-ammonia. The only thing which we can advise you to do is to have an enlargement made from the negative in its present state, worked up, and a copy negative made from it.

Societas.—There is no more complete list than that published in the current "B.J. Almanac." Naturally the war has occasioned the suspension of many societies and the cessation of others, but the list is as complete and as accurate as we have been able to make it by successively sending three separate applications to society secretaries.

Liability.—The Mirroscope is a form of opaque projection lantern designed for popular use, that is for projection on a small scale. It was an American manufacture, and it is very doubtful if you could get one at the present time, but you might try one or two of the larger dealers in London. Messrs. Butcher supplied a similar article as the Radiopticon, and perhaps might be able to help you.

W. H. S.—The Ross actinic triplet is a very old lens introduced about 1863, and not very much used then or since, as the Dallmeyer triplet was the more popular instrument of this type. We are sorry that we cannot tell you very much about it, but we should say that a 10-in. lens would be a serviceable instrument for cabinet portraits and could be used at a pinch for groups and architecture on a whole-plate, though we should say that the definition to the edges of this larger plate would be scarcely up to the mark. We suppose you are right in stating the maximum aperture at $f/8$: we find it mentioned as $f/16$.

W. M. D.—These intense brown stains with chromium intensifier are rare, but, so far as our experience goes, what appears to be the most probable cause of them is exposure of the negative, whilst in a bleached state or during re-development, to strong light. About the best means which are known of removing the stain is to rub the whole surface of the negative with a solution of, say, 5 per cent. strength sulphite of soda, with enough hydrochloric acid added to it to make the mixture smell distinctly of sulphurous acid (the smell of burning sulphur). It is necessary to rub the whole surface of the negative, as the density is slightly reduced by this treatment.

B. H.—It is not possible to say with any certainty what is the cause of the whitish markings on the sulphide-toned prints. It is a somewhat common defect, and we believe is liable to occur most frequently when a stronger solution of sulphide than is necessary is used. Very likely, also, insufficient washing between bleaching and sulphiding has something to do with it, but it is not necessary to wash for a long time between these two operations. If prints get a free exposure to running water for five minutes this amount of washing ought to be ample. Perhaps you may find in these two hints the means of avoiding further occurrence of the defect, but we are sorry that we cannot tell you anything more definite as to its cause.

Fading Colours.—Will you kindly advise me what to do to prevent the fading of the colours of sketch portraits, and if there is any method of treating either the portrait or the prints which will materially add to the permanence of colours? Ordinary bromide prints are used, and the best water-colours obtainable, yet with very rare exceptions, practically every bit of colour disappears from the specimens exhibited within a few weeks. The most puzzling part to me is the fact of one of two specimens exhibited in the strongest light keeping its colour, and the other losing all save the first flesh colour, which has changed to an unnatural yellow tint.—E. W.

We are unable to explain your difficulty, and can only think you must be using a medium with your colours which sets up some chemical action. Perhaps your ox-gall is very inferior and not purified. Hypo will quickly cause some colours to fade if the paper is not properly washed. Have you tried Winsor and Newton's selected list of permanent colours?

S. E.—1. It is not exactly a combination which would be considered the thing by a high-class photographer, but providing the two businesses are carried on in a more or less dignified manner we cannot see that there is any objection. 2. We should certainly say that permits are still necessary, at any rate for all coast towns. You should apply in the first instance to the chief police officer, from whom the first form in the way of obtaining a permit is to be obtained. 3. It depends on the regulations. In some places it is prohibited even to be in possession of apparatus without a permit, but we should hardly think that this is the case in your town. 4. Surely any agreement you have with the landlord specifies the term of notice, and the new landlord cannot possibly give you a shorter notice. But we think you might obtain the aid of a solicitor with the object of obstructing any attempt to get you out of the premises. In these days a County Court judge has great power in this respect, and is usually on the side of the tenant who is suffering hardship through the sale of the property.

S. C.—(1) With certain subjects there is no doubt an advantage in the use of a graduated light-filter, for example in Alpine scenes, where very brightly lighted cloud masses occur, also with a strong foreground of dark trees. In these cases the benefit of the wedge filter is exactly as you suggest, namely, that it equalises more or less the illumination on the plate and thus enables the plate to deal accurately with a subject which otherwise would be of too great a range for reasonably correct reproduction. The worst of the wedge screen is that it needs very careful adjustment; unless this care is exercised it may make matters worse. (2) The "Sinclair" is a very efficient form of hood, and its extensibility allows of the maximum shade action being obtained with lenses of different view angle. When so adjusted there would be scarcely any further advantage, we think, in the use of diaphragms within the camera. (3) The only fitment of the kind to which apparently you refer is one which was, and we believe is, fairly common on American cameras, in which the focussing-screen is attached to the camera back by a pair of springs, so that the plate-holder can be thrust between the back and the focussing-screen frame preparatory to making an exposure. After the plate is exposed and when the dark-slide is withdrawn from the camera the springs bring the focussing-screen back into register. We do not recollect having seen this arrangement on any British camera, but it is one which is perfectly easy to fit; and we are quite sure that either Messrs. Sinclair or a firm of camera repairers such as Messrs. H. T. Ball and Co., 54, Berwick Street, Oxford Street, London, W.1, could adapt it to your "Una."

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THE BRITISH

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SUMMARY.

In a leading article on the construction and adjustment of the portrait lens we take the opportunity of giving precise instructions for the proper placing of the component glasses of portrait lenses made according to the original Petzval pattern and to the Dallmeyer modification of it. These notes, in conjunction with the drawings, should be sufficient to guide the photographer unskilled in optical matters in reassembling correctly a portrait lens which has been taken apart for cleaning. (P. 290.)

A recent address by Mr. R. Shepherd, secretary of the Liverpool Amateur Photographic Association, deals in an interesting way with the society, which is almost the oldest photographic body in the country, and has special claims upon the interest of our readers from the fact that its "Journal," after several successive changes of name, but without interruption of publication, became the "British Journal of Photography." Mr. Shepherd pays adequate testimony to the revolutionary work of Sayce and Bolton in the origination of collodio-bromide dry-plates. (P. 292.)

Mr. A. Lockett, in a contributed article, describes a method of calculating the separation in telephotographic work. (P. 291.)

The co-operative closing of photographic studios is announced in reference to Keighley and Northampton, the latter town having been the first to adopt the scheme, which had its origination there with Mr. S. H. Greenway. (P. 299.)

One effect of concerted measures towards co-operative closing is in the direction of the establishment of local associations of professional photographers (P. 289.)

The newly-formed association of Lancashire photographers is to be called "Society of Master Photographers: Lancashire and District." (P. 295.)

In the colouring of prints or lantern-slides with aniline dyes, a caution, mentioned by a correspondent, is to avoid the use of preliminary hardening with an alum bath or in a fixing-hardening bath. Certain dyes are liable to profound changes of tint when applied to alum-treated gelatine. (P. 299.)

Some hints on the photographic rendering of the hair in portraiture are contributed to "Assistants' Notes." (P. 296.)

The exhibition of the London Salon will be held from September 14 to October 14. (P. 289.)

A material which might well receive the attention of manufacturers in this country is a paper for while-you-wait portraits, specially adaptable for the making of positives direct by a process of reversal and re-development similar to that employed for Autochrome plates. (P. 290.)

There are many subjects in the working up of which the Bromoil process offers distinct advantages over other methods, and affords, moreover, an assurance of permanence. (P. 290.)

EX-CATHEDRA.

The London Salon. By a unanimous decision of its members the annual exhibition of the London Salon is to be held again this year at the Galleries of the Royal Water-Colour Society, 5a, Pall Mall East, London, S.W. The exhibition is to open on September 14 and to close on October 12: the last day upon which exhibits can be received is September 3. Exhibitors from abroad who may be able to contribute to the exhibition should note that prints are to be sent unmounted and unframed in postal packets not exceeding 7 lbs. in weight. Pictures from exhibitors in this country must not be framed, and may be mounted or unmounted at the sender's discretion. But if they are mounted the outside dimensions of the mount require to be 15 by 12, 20 by 16, or 25 by 20 inches (in no case larger than the last named), and, wherever possible, white or of light tone. Those which are sent unmounted and are selected for exhibition will be mounted by the committee, and all accepted entries will be shown under glass. An entry or packing fee of three shillings is charged, and covers any number of pictures from one exhibitor. The entry forms will be ready shortly, and applications for them, as well as all communications in reference to the exhibition, should be addressed to the Secretary, the Photographic Salon, at the Galleries.

* * *

More Co-operative Closing. We are glad to see that the movement in certain towns towards the adoption of the closing of all studios for the same period as a means of providing and simplifying assistants' holidays is being taken up by photographers in Sheffield. As reported in a letter last week, agreement as to this arrangement has been come to by nearly all the principal photographers in the town, and it is hoped that before the time arrives for putting the proposition into practice unanimity may be secured. A feature of these concerted measures, which is to be regarded with satisfaction, is that the meetings held for considering them have had another and a still more useful outcome, namely, the establishment of an association of photographers, in the case of Sheffield, to be affiliated with the P.P.A. It would seem that the circumstances of the times are operating in the direction of overcoming—or perhaps we should say harmonising—the highly individualistic spirit which is a characteristic of photographers no less than of members of many other professions or businesses in this country. Local branches of the Professional Photographers' Association were in existence some years ago, but from one cause or another have gradually ebbed away. It may be hoped that the measures which are being taken in Sheffield and in other places will succeed in re-establishing them upon a firmer basis.

A Word for Bromoil. Bromoil, or any form of "oil" printing, does not seem to have appealed to professional photographers to the extent which might have been expected, considering the advantages which it offers in the way of control. This may best be explained by describing an enlargement which we recently saw in process of pigmenting. The subject was a head-and-shoulders study of an old fisherman against a very confusing and broken up background, while the figure was clothed in oilskins, which gave sharp contrasts of light and shade and hard angular lines. To have "finished" such an enlargement in the ordinary way would have taken many hours of work, and no matter how skilfully it was done the handwork would have appeared disagreeably evident. The treatment by Bromoil, however, resulted, with about an hour's work, in a soft harmonious picture in a rich sepia tone with transparent shadows and soft high-lights, and with the comfortable assurance of absolute permanency. Nothing is so disheartening to a photographer as to see a carefully finished enlargement change, either from a fading of the image itself or of the colours with which it has been finished. As the Bromoil image is homogeneous, being entirely composed of the same oil pigment, this cannot occur, the result being as permanent as a monochrome sketch in oil, or, what is perhaps a better analogy, a mezzotint engraving. Bromoil is not a difficult process provided a suitable paper is selected for the enlargement, and since the commencement of the war there has been a considerable difference in the quality of many of the brands of paper previously found suitable. There seems to be a general tendency to produce a harder coating, so that it is more difficult to obtain "relief." In these circumstances it is better for the beginner to start with one of the special grades made for Bromoil, two makes of which are those of Griffin and Illingworth.

* * *

While-You-Wait Materials. The interference with the ordinary supply of the sensitive ferrotype plates and cards employed by the beach and street-corner photographer has been the cause of bringing to our notice the very widespread demand which exists for these materials, the chief source of which, so we understand, has been in the past America and Germany. The sensitive ferrotype plate or card, which is developed as a thin negative image of whitish colour on a black support in a combined developing and fixing bath, is, of course, a special description of material, to the manufacture of which, apparently, firms in this country have hitherto not thought it worth their while to turn their attention. It may, therefore, be of some service to utter a reminder of the greatly superior type of while-you-wait portrait which can be made with the same expedition by operating upon an altogether different system. The direct positive obtained by a whitish deposit on a black support is a poor thing at the best, and its popularity is simply due to the fact that nothing better is available. The use of a thinly-coated emulsion paper specially made so as to be readily reversible by a process similar to that used in the making of an Autochrome transparency provides the means of producing a single print, which may be of the very finest photographic quality. A paper of this kind was put upon the market in a small way from America some five or six years ago, but secured small sales, apparently for the reason that changes in the American factory interfered with its supply. The method of its manipulation consisted in development, removal of the initial negative image by a silver solvent bath such as bichromate or permanganate, and the "redevelopment" of the residual positive image by means of a sulphide bath. It will thus be seen that no hypo is used or is necessary in the process, and the prints, in addition to their fine quality, should possess a very high degree of permanence.

THE PORTRAIT LENS AND ITS ADJUSTMENTS.

ALTHOUGH there are now upon the market many lenses of great rapidity which are eminently suitable for portraiture, the distinctive title of "portrait lens" is almost exclusively applied to instruments of the Petzval construction or of the Dallmeyer modification of it. Generally the intensity of the Petzval type of lens ranges between $f/2$ and $f/6$, while the maximum intensity of the larger anastigmats is about $f/3.5$. Hence it will be seen that the latter possess the essential quality of rapidity to almost the same degree as the older form of "portrait" objective. Although it does not quite come within the scope of our title, we may be forgiven for reminding readers who are inexpert in optics that the construction of a lens has no effect upon the "drawing" or perspective of the photograph. Lenses of equal focal length give similar results at the same distance; definition and covering power may differ widely, but the size of image and the relative size, say, of hands, feet, and head in a sitting figure will be the same.

The orginal construction of the Petzval portrait lens as first made by Voigtländer in 1840 has been little altered up to the present time. The only modifications are those necessitated by variations in the nature of the glass employed. The accompanying diagram (fig. 1) shows the form and position of the various glasses, the open surfaces of which are distinguished by numbers, the dotted outline representing the mount. In many lenses the glasses are not permanently fixed into the brass cells, but dropped in and secured by a clamping ring or "counter cell." It is, therefore, necessary to be very careful, if they have been removed for any purpose, that they are replaced in their proper positions, for if this be not done the lens will be rendered useless for the time being. The front combination is dropped into the cell with the convex side downwards and held by screwing the counter cell home until there is only the slightest play between the glass and metal. This is tested by shaking the cell while it is held close to the ear. If the counter cell is screwed home tightly there is danger of putting a strain on the glass and impairing the definition. There is a much greater chance of mistake when assembling the back combination, as here we have two lenses each of which may be wrongly placed, or the whole combination may be reversed. Reference to the diagram will make the proper arrangement quite clear. On looking through the glasses it will be seen that one magnifies objects and the other diminishes them. Take the magnifying lens and examine the two curves. It will be found that one is flatter than the other. Put the brass cell upon a table and drop in the lens flat side downwards (curve 6, fig. 1). Put in the brass separating ring and drop in the diminishing lens, hollow side down (curve 4, fig. 1). Screw in the counter cell in the same way as directed for the front lens. The commonest error is to

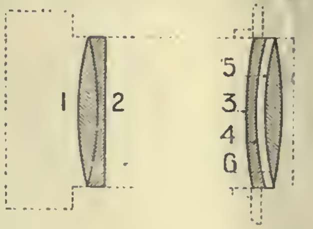

Fig. 1.

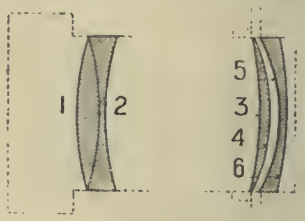

Fig. 2.

reverse the position of the surfaces 5 and 6. If this has been done the central definition will not be impaired, but it will fail off very rapidly, only a very small circle being properly covered. Most English opticians burnish the glasses into the various cells so that it is impossible to disarrange them, and this affords a slight check on forgeries. So far as we know, Ross, Dallmeyer, and Grubb have always done so, so that if a lens bears one of these names and has the loose lenses and separating ring, it should be looked upon with suspicion.

The Dallmeyer portrait lens patented in 1866, although similar in the general idea, has important differences in construction. It will be noticed from the diagram (fig. 2) that surface No. 2 has quite a deep curve instead of being nearly flat as in fig. 1, while the form of the two back glasses is not only different, but their positions are reversed, the diminishing lens being placed outside or next the plate. Lenses of this construction have also been made by Ross and Swift, and the glasses are always burnished into their cells, so that displacement is impossible. Lenses of this type have a very useful quality, generally known as "diffusion of focus," that is to say, by altering the distance between the surfaces 4 and 5 (fig. 2) any degree of unsharpness can be obtained. When these surfaces are as close together as the screw thread will allow, the definition is quite sharp, but as the back ring of the back cell (not the *entire* cell) is rotated, the definition becomes softer until, with a large aperture, it becomes distinctly fuzzy. All the earlier Dallmeyer "Patent" portrait lenses had notches cut in this back ring thus: I II III IIII, with a small brass pin to serve as a pointer. These notches indicated the degree of unscrewing up to a whole turn. Two or even three complete turns may be given if desired. A few years ago a new form of mounting was introduced, which enabled the diffusion arrangement to be worked by rotating the entire lens in its flange, the back cell being rigidly held. It should be noted that focussing should always be done after unscrewing the diffusing arrangement and not before, as the focal length is slightly altered by so doing. It may be as well to point out that no perceptible alteration in definition can be obtained by varying the distance between the two back lenses in the Petzval model (fig. 1), nor by unscrewing the back cell as a whole. Variations in the length of the tube have, however, a considerable effect on the covering power of the instrument. Shortening the tube reduces astigmatism, but introduces curvature of field, while lengthening it has the reverse effect. Some makers have introduced a sliding adjustment for this purpose. The well-known French optician Derogy fitted many of his lenses thus, while they had in addition supplementary combinations for lengthening or shortening the focal length, these being introduced between the usual combinations.

The terms "crown" and "flint" are often applied to the various components of lenses. Originally they referred to the actual varieties of glass used, but in later years mainly refer to the form of the lenses. Thus, lenses which are as a whole convex, or magnifiers, are usually called "crown," while those which are concave or diminish are styled "flint." This will explain any references to the "back crown" or "back flint" lenses which may be encountered in popular books on lenses.

Lenses of the Petzval construction are frequently employed for purposes other than portraiture. For example, these objectives are usually sold with enlarging lanterns, and are fitted to cinematograph cameras and projectors. The lenses on the better class of magic lantern are of similar construction, but cannot be relied upon to be corrected for photography. This can, however, be ascertained by a trial, and the result may be that a useful lens, for small portraits or great enlargement when copying, is discovered. Many of the cinema lenses are of great intensity, *f*/2 or over, and may be useful for ordinary work on small plates.

The word "portrait" is often used in conjunction with "Euryscope" or "Aplanat," and simply indicates a greater degree of rapidity than is usual with that particular type of lens. Similar lenses were called "Extra Rapid Rectilinears" by Dallmeyer and "Universal Symmetricals" by Ross.

One useful modification of the portrait lens, whether it be Petzval or Dallmeyer, is the use of the front lens alone, the back being entirely dispensed with, for soft focus effects. The focal length is, of course, much greater than the complete lens, hence it is better adapted for large heads. If used in its normal position a moderate degree of softness or diffusion is obtained, while if placed at the back of the tube in the thread usually occupied by the back lens the image is still further softened. This gives a useful mean between the extreme sharpness of the ordinary lens and the pronounced fuzziness of the anachromats.

A FORMULA FOR TELEPHOTO SEPARATION.

Most photographers know that the magnification of a telephoto lens depends on the degree of separation between the positive lens and the negative element or attachment. Sometimes this separation is fixed and only one magnification is possible, but when it is variable the magnification will increase the nearer the negative lens is to the positive, or decrease the further it is away.

Usually, though not invariably, the mount of the telephoto lens is so arranged that the negative element remains stationary, while the positive may be racked in or out. This construction allows a given magnification to be obtained by measuring the camera extension from the negative lens to the focussing screen, which will be equal to the focus of the negative lens multiplied by the magnification minus 1, or $E=f_{,}\times(-_{,})$, and then adjusting the separation. Various measuring appliances have been introduced for this purpose, such as Dallmeyer's calculator, which consists of a graduated spring tape, and the sliding wooden scale devised by Captain Owen Wheeler.

Often, however, it may not be convenient to measure the extension, or there may be no means available. In that case one can only proceed by first adjusting the separation and then racking the camera in and out till the image is in focus. If the mount is engraved with the desired magnification there is no difficulty, but if that particular magnification is not marked, or if the combination is an experimental one with no graduations at all, the wished-for result calls for a tedious succession of trials.

It seems, therefore, that a formula is desirable for finding the nodal separation between the positive and the negative lens for any given magnification. It is believed that no such simple formula has been given. We have rules for finding the extension, the magnification, the aperture, the equivalent focus, the circle of illumination and the angle of view of a telephoto lens, but not for the one essential factor which really regulates all these. Certainly the principle has been broadly stated in text-books, but the puzzled reader has hitherto been left to deduce definite figures for himself, from the theory of the "telescopic condition" and the "optical interval" or "delta."

The writer has worked out a non-complicated and accurate formula which gives the nodal separation for any magnification in a few seconds. It is as follows:—Let f_1 = the focus of the positive lens, f_2 = the focus of the negative lens, and M = the magnification in linear diameters. Then the separation will be equal to

$$f_1 - f_2 + \frac{f_2}{M}.$$

For example, with a positive lens of 8 in. focus and a negative element of 3 in. focus, a magnification of 4 diameters is required. Here the nodal separation needed will be:

$$8 - 3 + \frac{3}{4} = 5\tfrac{3}{4} \text{ ins.}$$

Now, with the same telephoto combination, $f_1 - f_2$ will obviously remain constant, the only variable factor being $\frac{f_2}{M}$. So, if we make a file mark on the moving part of the lens mount, at any previously ascertained magnification, the separation for other magnifications may be found by simply calculating the difference between the two fractions and measuring that distance from the first mark. This affords a ready means of graduating the mount of a telephoto lens, or of adding to its existing graduations, without needing to know the position of the nodes or to measure the extension, provided only the focus of the negative lens is known.

For instance, one may first focus with the positive lens alone on some conspicuous distant object, such as a church spire, measuring the length of its image on the screen. Then, without altering the position of the camera, the negative lens is also affixed, and by a series of adjustments, focussings and measurements of the image, one is obtained, say, exactly twice as large as before, this being, of course, a magnification of 2 diameters. A mark is now made on the moving part of the lens mount, against the edge of the fixed portion. Suppose the negative lens is known to be of 3 in. focus. Then, if it is desired to mark the lens for a magnification of, say, 5 diameters, it is only necessary to make another mark at a distance from the first equal to the difference between the fractions $\frac{3}{2}$ and $\frac{3}{5}$, or $\frac{15-6}{10} = \frac{9}{10}$ in., as shown by Fig. 1. Since the new magnification is higher, the mark must be so placed that the positive lens will be racked to that extent further in.

Or, again, suppose it is desired to add more graduations to an existing scale. It is quite easy to do this without having any other data whatever than those afforded by the scale itself. Say, a magnification of $1\frac{1}{2}$ diameters is wanted, while the scale is only graduated for 2, 4 and 6 diameters. Measure carefully the distance between the graduations 2 and 4. Suppose it to be $\frac{1}{2}$ in. Then by the foregoing rule it is clear that $\frac{f_2}{2} - \frac{f_2}{4} = \frac{1}{2}$ in. To find the unknown value of f_2 substitute 1 for f_2, and divide the first fraction by the second fraction so obtained. Thus:—

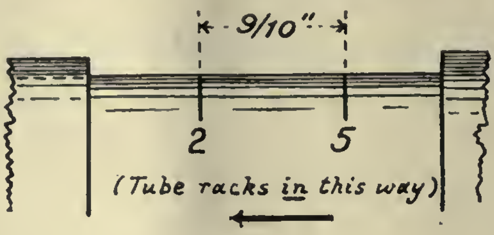

Fig. I.

$$\frac{f_2}{2} - \frac{f_2}{4} = \tfrac{1}{2}\text{in.} \quad \text{(1st fraction.)}$$

$$\frac{1}{2} - \frac{1}{4} = \tfrac{1}{4}\text{in.} \quad \text{(2nd fraction.)}$$

$$\frac{1}{2} \div \frac{1}{4} = 2, \text{ the value of } f_2.$$

Therefore, to find the mark for $1\frac{1}{2}$ diameters, ascertain the difference between $\frac{f_2}{1\frac{1}{2}}$ and $\frac{f_2}{2}$, or $\frac{2}{1\frac{1}{2}} - \frac{2}{2} = \frac{4-3}{3} = \frac{1}{3}$ in.

Accordingly, make a mark on the lens mount $\frac{1}{3}$ in. from the 2-diameter mark, as shown by Fig. 2, so that at this new mark the positive lens will be racked further out (since it is a lower magnification), and we shall then have the correct adjustment for $1\frac{1}{2}$ diameters.

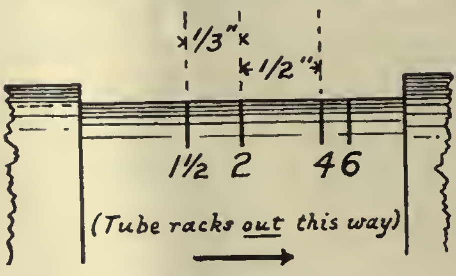

Fig. 2.

A. LOCKETT.

THE LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

[We are glad to have the opportunity of printing the substance of an address delivered last week at a luncheon of the Liverpool Rotary Club, at which the author, Mr. R. Shepherd, was the invited speaker. Mr. Shepherd, as the secretary of the Liverpool Amateur Photographic Association, is specially qualified to review the past history of what is almost the oldest photographic society in the country, and his subject is one the interest of which we and no doubt many of our readers share with him, on account of the fact that the "Journal" of the Liverpool Society, issued in the second year of its existence, after passing under several different titles, but without interruption of continuous publication, became the "British Journal of Photography." The Liverpool Society has been associated with several important developments in photography, and Mr. Shepherd's paper deals interestingly with these and with the conditions of practical photographic work in the old days.—EDS. "B. J."]

I AM greatly honoured by being your guest this afternoon, and am glad to have the opportunity of putting before you some notes regarding an old Liverpool society which does not at the present-day come often into the limelight, but which has had a useful and —I think I may say—a somewhat illustrious career. This is not the occasion for entering into any detailed history of photography, but it will be of advantage to look for a few moments at the middle years of the last century and to consider what was the position of the science of photography at that time.

The idea that in some way the beautiful pictures revealed by the camera-obscura might be perpetuated without the laborious process of copying them by pen, pencil, or brush, was an attractive one to many minds, and various methods were devised for carrying it out. The fact discovered in the sixteenth century that silver salts are blackened under the influence of the sun's rays seemed to afford a solution. After obtaining some very small degree of success by the use of bitumen, which undergoes a physical alteration under the influence of strong light, Joseph Nicéphore Niépce in 1816 produced some pictures by making use of the action of light upon a silver salt. Louis Daguerre, a Parisian scene painter, and the inventor, by the way, of what some of us remember in our youthful days as the diorama, was also tackling the subject in a different way. He was able to produce a very beautiful picture on a polished silver plate treated with vapour of iodine, or upon a silvered and polished copper plate rendered sensitive to light in the same way. I show a rather interesting specimen of his process in the shape of a Daguerreotype of the camp on the Boulevard du Temple in Paris during the Revolution of 1848. It was in 1839 that Daguerre published details of his process. Licenses were issued to photographers in many parts of the world, and for many years the Daguerreotype held the field. A large number of these photographs have survived; they are of great beauty and were often hand-coloured with great skill, but they had several serious drawbacks. They were expensive, one exposure resulted in only one picture, and when used for portraiture the sitting had to be very much prolonged. It was obvious that finality had not been reached, but that development must be sought on entirely different lines. Naturally, the first desideratum seemed to be the attainment of a method whereby people of small means could obtain a fairly accurate presentment of the features and expressions of those dear to them. Up to 1839 the only means available to such people was the black paper silhouette, some of which were exceedingly clever work, or at the best a portrait in oil by some cheap and possibly quite incompetent artist.

Fox Talbot, an Englishman, produced a process in 1839 by using paper treated with a silver salt. This yielded a negative from which many positive copies could be made. Nièpce de St. Victor substituted glass for this paper support of Fox Talbot, using a film of albumen or white of egg as a vehicle to contain the silver salt.

In 1847 collodion was discovered, that is a solution of guncotton in ether and alcohol. In 1852 Scott Archer published a method of using collodion instead of the troublesome and unstable albumen film, and photography then began to take a definite shape and became attractive to the scientifically-minded amateurs of whom there were not a few in Liverpool.

Several of these used to meet in each other's houses to discuss the new art and the wonderful new pictures made by the rays of the sun. They also used to foregather at the shop of Mr. Joseph Atkinson, an optician in Manchester Street, who was a very clever mechanician and an enthusiast in the new art. Mr. Atkinson seems to have been willing to put his experience at the disposal of those interested in photography and to help and advise them in their pursuit of knowledge. As a result it was decided to found a society for mutual help and for the advancement of the infant art. A meeting was accordingly held at Messrs. Forrest and Bromley's office in Lime Street on March 9, 1853. The names of those present were Messrs. James Newlands, Julius Stevens, Francis Frith, G. B. Berry, C. H. Chadburn, Christopher Bell, and James A. Forrest, who acted as secretary, pro tem. A resolution was passed to form a society, and at a further meeting held on March 22 the society was definitely formed and rules adopted.

These rules were based upon those of the London Society, which had been founded a few weeks previously. That society eventually became what is now the Royal Photographic Society. Reference was made at the meeting to a Yorkshire society, but I cannot trace that there is any Yorkshire society now existing that reaches back to that period.

The chairman of this meeting was Mr. Picton, who in his opening speech called attention to the capabilities of photography in assisting high art and to the wide field of experiment and research that is presented. The Mayor of Liverpool agreed to act as its first president, and Messrs. Forrest and Mackinlay were appointed joint secretaries. I mention the names of these early enthusiasts not, unfortunately, because they convey much to me who have only been in Liverpool for the past thirteen years, but in case they may recall some memories to some of you, though it is not probable that any of them remain on this side of the "Great Divide."

In regard to membership no distinction was made between amateurs and professionals, though at an early date troubles arose in this connection. Carefully detailed minutes of the meetings were kept, and make interesting reading. It is evident that these gentlemen took the matter very seriously: their discussions and debates were conducted on the lines of the great scientific societies. The whole subject in all its bearings was dealt with—the optics, chemistry, and technique of photography. At the second meeting, for instance, a Mr. Berry, of Apothecaries' Hall, read a paper on collodion negatives, then just beginning to be generally used. In it he describes his method of preparing the gun-cotton that was the principal constituent of the collodion. The question of climate arose, and the president, Mr. Bell, stated that for photography he preferred the British atmosphere to the American or French for the taking of scenery. This view was vigorously combated, but I think that most pictorial photographers of to-day would agree with Mr. Bell that for producing atmospheric perspective and tender gradations of tone our own much-maligned climate is absolutely unsurpassed.

In these days when one sees in almost every chemist's window displays of cameras at prices reaching down to less than half a sovereign, it is interesting to read discussions on various types of portable camera and to trace the evolution of the modern hand-camera in its early stages, though the enthusiasts of those old days were handicapped by the slowness of the wet plate.

The practicability of making enlarged pictures from a negative was also discussed. This, of course, was rendered difficult by the slow speed of the printing papers that were available. In fact, one may say that in everything relating to photography original and most valuable pioneer work was done by this society in the face of great difficulty

And the artistic side was by no means neglected. Mr. Frank Howard, a well-known Liverpool artist and writer on art, was an enthusiastic member, and spoke at many of the meetings. On June 3, 1853, he read a paper entitled "Photography as Connected with the Fine Arts." This lecture, as reported in the "Liverpool Mercury," would occupy nearly two columns, closely printed, of the "Liverpool Daily Post" of to-day. In this paper he refers to the cheap portrait painter of the day, whose efforts, he says, "were principally devoted to giving a strongly marked diagram of the face in the shortest possible time and at the lowest possible price." And I think that puts the case pretty neatly. He compares their methods with those of the portrait photographer of his day, not very much to the advantage of the latter. One must bear in mind that at that time the Daguerrotype was the most perfect process known, and, being a positive, the features were represented as in a mirror—that is to say, the features were reversed; what purported to be the right side of the face was in reality the left. He commented on the strained brows and stony stare produced by the strong light of the operating-room and on the fixity of expression that entirely failed to convey the real individuality of the sitter. He compared a photographic portrait with a plaster cast that served to record the form of the features, and from which an artist could paint a picture.

As an illustration he referred to a drawing of children by Sir Thomas Lawrence, which he reckoned might have taken three or four hours to produce. He says: "Probably at no one moment during the period occupied in making the drawing were the children precisely in the aspect as they are represented. How," he says, "can even the collodion process hope to snatch evanescent charms like these, the result of various shades of expression and transitions of action combined by artistic skill?" Now, one would never dream of comparing the most perfect photographic portrait with the production of a first-rate portrait painter, but still, in recent years the possibilities of photographic portraiture have widened to an enormous extent, and masterly work in the way of character delineation is being done with the use of modern lenses and rapid plates by some professional and amateur photographers of to-day. I submit that this has been rendered possible to a very large extent by work done at a later stage by members of the L.A.P.A. This we shall, I hope, see presently.

During the second session, that is in 1854, the society was greatly interested in the subject of the photography of the moon's surface. Some time before, a series of detailed maps had been made at the cost of enormous labour, reaching over several years, but it was realised that if some arrangement could be devised for making the camera follow the moon's movements during the time required for taking the photograph the result ought to be much more accurate than any map that could be drawn by hand.

Something of the kind had been attempted by Professor Bond, of Cambridge in the United States, by means of the Daguerreotype process. It was only after spoiling over a hundred of these very expensive plates that he was able to get a record at all worth preserving, and when obtained it remained one record only, and could not be printed from. The British Association had offered a prize for the best photograph of the moon, and at the first meeting of the second session the chairman was able to produce a photograph that had been taken on the previous Monday night. I believe I am correct in saying that the photograph which I now exhibit is the one in question.

The work was carried out by Dr. Edwards, with the assistance of the astronomer Mr. Hartnup. The work was pursued and 150 or more photographs were made. The secretary, in reporting upon the results, said that the photograph had been magnified up to 24 ft. in diameter, and that every part of the definition came out with marvellous exactitude; so much so that they had the volcano "Tycho, among others, magnified to 10 ins. in diameter, and they could clearly see the light travelling across." There is no doubt that in this matter these Liverpool photographs were far ahead of anything that had previously been done.

The committee of the British Association, which was to meet that year in Liverpool, asked the society if it would arrange for the projection of one of these photographs upon a large scale in the Philharmonic Hall during the meeting of the Association. This was duly carried out, and the moon's image was projected on a screen, giving a picture 56 ft. in diameter.

Shortly after the formation of the society certain members, Messrs. James Newlands, then borough engineer, Christopher Bell and James Forrest decided to start a journal to further the science of photography, and for several years they carried on the "Liverpool Photographic Journal," which, I believe, was the first journal devoted to that end. Mr. Charles Corey was the first editor, and was very successful in that capacity. The copyright in the paper was afterwards sold to Mr. Henry Greenwood, the publisher, who was a member of the society, and in 1857 Mr. Greenwood changed the name to the "Liverpool and Manchester Journal of Photography," so as to include the operations of the Manchester Society, which was formed after the Liverpool one and on similar lines. Mr. Greenwood again altered the name of the paper, eventually calling it the "British Journal of Photography," under which title it has been published ever since. So that this old Liverpool society has the credit of publishing the very first journal that was devoted to the science and art of photography. For a time the Mr. Frederick Howard I have already referred to was editor, and after him for a short time—after the journal has passed into Mr. Greenwood's hands—the editor was Mr. William Crookes, now better known as Sir William Crookes, the eminent chemist and physicist who, in 1914, was president of the Royal Society. By the end of 1853 the Liverpool Photographic Society had 153 members. In 1854 the Earl of Sefton was president, the vice-presidents being Messrs. James Newlands, William Lassell, and R. B. Preston. In 1855 the presidency was offered to the Earl of Ellesmere, who suggested, however, that his son, Lord Brackley, should be made president as he was an enthusiastic photographer. In the end the father was appointed patron and the son president.

To give a small idea of the difficulties these early enthusiasts experienced I find that at a meeting a Mr. Jones was asked how he managed to measure a twelfth of a second. He explained that he had a special contrivance on the cap of his lens that enabled him to cap and uncap it as quick as thought. He considered that a good stride represented a second, and if he moved his foot forward one inch, capping the lens simultaneously with the completion of the movement he had about the twelfth of a second. It doesn't sound very convincing, but I give it as recorded in the minutes. Modern lens shutters are supposed to give speeds of anything up to 1/1000th of a second.

There is no doubt this was a grand old society, but it contained within itself a canker which after five years' vigorous and useful life eventually broke it up. There appears to have been from the outset an unfortunate feeling between the professional and the amateur members. It is perhaps natural that there should have been some reluctance on the part of the professional members to share their knowledge with each other and with their amateur brethren. The earlier processes were patented, and permission to use them was, I think, granted by licence; this at least applied to the Daguerreotype process. As many of these men had done research work of their own and were in keen competition there would be nothing strange if they had trade secrets and guarded them jealously. But happily all that is a thing of the long past. I do not think, so far as the methods and technique of photography are concerned, that there are any longer any secrets between the amateurs and the professional. I have heard an eminent professional photographer, a Fellow of the Royal Photographic Society, say so. Not a few well-known professionals of to-day have commenced as amateurs, and time and again experienced professional photographers have lectured and demonstrated in our clubroom and taught us all they could get us to absorb. There is no reason why we should be jealous of each other. All can be, and have been, mutually useful, and we can pursue our several paths without jostling each other. But, sad to say, the bitter feeling between the two sections led to a falling off in the enthusiasm of the majority of the members, subscriptions fell off, and in February, 1858, the members decided to wind up the society as a separate entity by merging it in the Historic Society of Lancashire and Cheshire. What was the subsequent history of the photographic section of this latter society I do not know. I trust it became, and that it continues to be, an actively useful department. But, however this may be, it seems obvious that a mere section of a society devoted to only one aspect of photographic practice could not satisfactorily serve the same end as one devoted to the advancement of the subject as a whole, and the leading spirits of the old society evidently felt this keenly, for six years later we find them again meeting to consider the formation of a purely photographic society.

In November, 1863, this meeting was held in the Leith offices in Moorfields. The following gentlemen were present:—Messrs. T. B. Banner, Forrest, Cook, B. J. Sayce, Mawdsley, Unsworth, Wilson, O'Brien, Golding, and Glover. I know of only one of these gentlemen who survives—namely, Mr. Golding, who has visited our present club rooms within the last two or three years. If any others are still among us I should greatly like to be made aware of it.

One gentleman, to whom I hope to refer later on, Mr. Osmond R. Green, a member of the old society, but not among those present at the first meeting, is still alive, and has given me a great deal of most valuable assistance in preparing these notes. Mr. Green is now resident in Leamington.

The objects of the new society were precisely the same as those of the old: the leaders were the same, excepting that the professional element had been eliminated, they having formed a society of their own. So that I think we may fairly say that the Liverpool Amateur Photographic Association, like the phœnix, arose out of its own ashes. We describe ourselves as being founded in 1853 and re-formed in 1863.

Mr. T. B. Banner presided at this first meeting, and Mr. J. B. Glover was elected secretary. For some years, by the courtesy of the Library and Museum Committee of the Corporation of Liverpool, the meetings were held at the rooms of the Free Library in William Brown Street. Following the practice of the day the Earl of Caithness was asked to be patron, and agreed to act. The meetings of the new society were on the same lines as the old, namely, those of a serious scientific society. At that time the use of the wet-collodion process was in full swing, although a certain number of photographic people still used albumen. The photographer possibly made his own guncotton, or, if he purchased it, he made out of it his own collodion by dissolving it in ether and alcohol. He poured the collodion containing an iodising substance in a thin film over his carefully cleaned and polished glass plate in the dark-room. When it had set he put it into a nitrate of silver bath, drained it, and put it in the plate-holder and exposed it whilst still moist in the camera. The latent image thus produced was developed into a negative by pyrogallic acid, and the silver unaffected by the light-rays was dissolved away by sodium hyposulphite or potassium cyanide, in other words the negative was fixed. All this required skill and patience, and was messy and in some respects unwholesome. It made photography in the open air a very troublesome matter, only to be faced by the enthusiast. It would seem as though all these early photographers were enthusiasts. Many attempts had been made to devise a plate that could be carried about in the dry state, and some success had been obtained, notably by Dr. Hill Norris, of Birmingham. But up to this time the effort had been largely concentrated on saving trouble at the stage of putting the collodion film on the glass. Many methods still required that the collodionised plate should receive its final bath of silver nitrate before being placed in the camera. At a very early stage the subject of producing a dry-plate occupied the attention of the society. Benjamin J. Sayce, who had made a special study of the subject, substituted bromide for iodide in the collodion, thus producing a more rapid plate. But it occurred to another member, Mr. W. B. Bolton: "Why can't we mix the silver nitrate with the collodion in the first instance, and pour the complete emulsion on the glass at one operation?" Sayce took up the idea and succeeded in producing a plate which could be dried ready to put in the camera without any further sensitising. This was the first emulsion dry-plate properly so-called, and the result of it was to revolutionise the whole practice of photography. In the "British Journal of Photography" of September 9, 1864, occurs the following: "Mr. Sayce has solved a problem which has puzzled many." In 1885, twenty-one years later, the jury of the International Inventions Exhibition granted to Mr. Sayce a gold medal and diploma for the discovery.

The substitution of gelatine for collodion by Dr. Maddox in 1871 and the later discovery of celluloid led on to the discovery of methods for making plates cheaper, more rapid, and more portable. This brought photography within the reach of everyone, and the provision of cheap cameras of the "press-the-button" order resulted in popular photography as we know it to-day. It is obvious that without the dry plate no such development could have taken place with such triumphs of the art as photographing from aeroplanes, not to mention the cinematograph. This invention alone, from among the ranks of its members, should suffice to shed lustre upon the Liverpool Amateur Photographic Association

The collodio-bromide silver process was worked at for some years by Messrs. Sayce and Bolton and by many of the Liverpool members, but although the invention had really revolutionised photography it did not catch on at first to any great extent outside of Liverpool. The wet-plate method held the field until well on in the 'eighties. The manufacture of dry plates was carried on successfully in Liverpool by several members of the Association, of whom one was Mr. Mawdsley, whose factory was afterwards removed to London. Gradually the dry plate, after many improvements in detail, gained ground, so that for many years the wet process has been extinct except for certain special purposes. Yet some of the work done by the old wet-collodion process has never been surpassed. As one gets nearer to the present day it becomes increasingly difficult to speak adequately of the outstanding members of the club, but I shall take one as an illustration of the enthusiasm and ability which has distinguished these pioneers.

Mr. Osmond R. Green, to whom I have already referred, joined the original society just before its dissolution. He was a prominent member of the new society, that is the present L.A.P.A. As I have told you, he is still with us, and is still a member of the Association. He has written me a number of letters lately in reply to requests for information for this paper. Mr. Green used to work with a camera carrying plates measuring 24 by 18 ins. As you may imagine, it was "some" camera. Mr. Green gave it to our association, together with a large number of his wonderful negatives. I cannot show you the camera, but the lens which I exhibit measures, with the hood, over 10 ins. in length, and the glass of the lens is 6 ins. in diameter. The plates were of plate-glass. Mr. Green coated them himself by the ordinary wet-collodion process. To handle plates of such an enormous size very special arrangements were, of course, required, and I believe Mr. Green went about with a conveyance and a tent for changing his plates. Even after the bromide emulsion or dry-plate method came into vogue it was no small business, and Mr. Green tells me that he took about with him twenty plates of 24 by 18 ins. in size in a grooved box, each one of the plate-glasses weighing about 8 lbs. The resulting photographic prints were of splendid quality. Mr. Green was an acknowledged master of the art, and his work was exhibited and known far and wide. I have two of his negatives here—one of Melrose Abbey, taken by the collodio-bromide process of Sayce and Bolton in 1867 or 1868. The plate was coated by Mr. Green himself. It is to a photographer a superb negative, and I show a print made from it by the Autotype Company by their carbon process. Mr. Green travelled over the North of Africa, Italy, and Greece, taking with him a camera using plates 7 x 5 ins. I show a print of the Arch of Constantine from one of these negatives, enlarged and printed in carbon by the Autotype Company; also one of the Forum Romanum, both of which are splendid works. As a contrast with the Gargantuan apparatus of Mr. Green may be exhibited a modern camera of what is nearly the smallest pattern (a No. 1 Ensignette). It is a practical instrument, and with it many pictures have been made which, when enlarged and printed in the very modern Bromoil transfer process, have been exhibited in our own rooms, at the Camera Club in London, and elsewhere. Mr. Green was only one of many whose skill and enthusiasm have done much to carry forward the evolution of photography.

For a number of years the meetings of the Association were held at the Art Gallery in William Brown Street, and after several changes the members settled down in their present spacious club-rooms in Eberle Street. For many years the meetings were carried on with great enthusiasm, many branches of the subject being studied and debated. Gradually as photography increased in importance the manufacturers equipped their own laboratories and employed their own skilled technical staff. The London Society also, now the Royal Photographic Society, owing no doubt to its metropolitan position, became the great debating ground for the more technical and scientific side of the subject. But the Liverpool Association became more and more a meeting place for people of kindred tastes, who for the most part found their technical difficulties solved for them by the manufacturers. The winter meetings and the summer excursions continued to be a great attraction, and, subject to the limitations caused by the war, this state of affairs is well maintained.

And still the old Association was productive of new departures. Mr. Rawlins, who introduced the beautiful oil process by which a sheet of paper covered with gelatine and soaked in bichromate of potassium is made to retain lithographic ink applied to it by means of a brush, so that the image latent in the prepared paper after exposure under the negative is developed in oil pigment, Mr. Rawlins, I say, was a member of the Association. Mr. Chas. F. Inston, a fellow of the Royal Photographic Society, whose loss we deplored only last year, was one of the foremost exponents in the world of the oil process, and of the Bromoil pigment process, an outcome of that just mentioned. Mr. Chas. Stuart, of Liverpool, has carried this further by applying coloured pigments and producing a polychrome effect, which he transfers to plain paper. I believe Mr. Stuart was the first person to do this transfer colour work. I show here one of his multi-colour Bromoil pictures, which he has kindly lent me for this occasion.

I am afraid I have trespassed too long on your forbearance, and will draw to a close. The society is still alive and active, although naturally war conditions stand in the way at the moment. The members meet in our club-rooms, which are open all day long, for social intercourse and to exchange their experiences and help to solve each other's photographic difficulties. All through the winter lectures are given on Thursday evenings, illustrated as a rule by the club's projection lantern. The lectures, which mostly relate to travel, are interspersed with demonstrations by experts in various departments of photography. From time to time one-man exhibitions of work by well-known pictorial and portrait photographers are held. At this present moment a collection of very clever portrait studies by Mr. Hugo Wadenoyen are hanging upon our walls. The membership of the Association now stands at nearly 200, and is increasing. Altogether it may be thought that Liverpool has no cause to be ashamed of the Liverpool Amateur Photographic Association.

R. SHEPHERD.

GAS AND COAL ECONOMY.—Probably by the time this issue reaches the reader the Government will have published its new Order restricting the consumption of coal, gas, and electric current according to a scheme which, it would seem, provides alternatives in the consumption of these commodities. The previous Order, relating only to gas and electric current, was plainly destined, from its impracticable nature, to a short life. The new Order is apparently more in accordance with what is possible.

LANCASHIRE MASTER PHOTOGRAPHERS.—A committee meeting of the above was held last week in Blackpool, followed by a general meeting of master photographers in Lancashire, at both of which Mr. F. Kenworthy presided, in the unavoidable absence of Mr. N. S. Kay. The title of the new organisation was decided on: "Society of Master Photographers: Lancashire and District." The meetings were most successful in every way, and several important decisions were arrived at. The society will be affiliated to the P.P.A. Nominations for membership (the subscription for which is 10s. 6d. per annum) will be accepted by the Hon. Secretary, F. Read, 14, Balfour Road, Southport. The next meeting was fixed for July 16, in Liverpool.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

The Hair in Portraiture.

Much of the portraiture that one sees is spoilt by reason of the fact that operators give far too little attention to a proper rendering of the sitter's hair. Either we see it blurred, almost to wooliness, and far from natural, or else it has the texture of fine wire; and in this latter case the eye of the beholder is irritated by the intense sharpness. The aim of the operator when focussing for the hair is to give a suggestion of lustre and texture. With many feminine sitters much that is delightful may be traced to beautiful hair, and upon a satisfactory rendering of this much of the success of the picture depends. To get the best results colour will have to be taken into consideration, and an ortho plate of the anti-screen type used, or the exposure made upon a panchromatic plate without a screen, in preference to the portrait or studio plate; in either case a more satisfactory rendering of the colour of the hair will be obtained. It is not always admissible to make any suggestions with regard to dressing the hair, but a hint may be given to the sitter as to the advisability of keeping to the everyday style in preference to anything fresh, as is so often done when a picture is to be taken. In the latter case much of the natural wave and lustre of the hair will certainly be lost. Hair ornaments or ribbons of any kind are best avoided, as they only tend to create a distracting note.

Lighting will be found to play an important part, and if this point is given attention the black textureless patches so often seen in portraits will not appear. A very slight diffusion, avoiding the needle point definition, which gives the unpleasant "wirey" effect referred to above, is a great help, but it must not be carried too far, or the suggestion of the natural wave and texture will be lost. In this the soft-focus lens is of great assistance.

Perhaps the most difficult hair to render in a satisfactory manner is that which is long, dark, and without much lustre. In this case it is best to use as strong a lighting as possible, in order to give what texture there is a chance to be seen at its best, and then by diffusion to counteract the difficulty.

When dealing with male sitters, the hair is generally of less account, unless it forms quite a characteristic of the sitter, and so presents less difficulty in this respect. Perhaps bearded men are amongst the greatest problems the operator has to encounter, as anything of a "wirey" or "ropey" nature is most unpleasant, and will neither satisfy portrayer nor the portrayed. With bearded men the beard is an individual feature, and must be recorded successfully. And here again the diffusion given by the soft-focus lens will prove helpful. The point to be noted is that all the sitters who are photographed have some distinctive characteristic in hair or beard (if one is worn), and no result can be regarded as pleasing unless a faithful rendering of this is presented, and the points set forth above are worthy of the study of all operators, being some of the small things by which the success of photography is made up.—Expert.

Knife Work on Bromides.

The other day I was troubled with a number of black marks like very large pinholes in the emulsion of some small bromide enlargements. The bromide paper was of a well-known and first-class brand, and the trouble was no doubt due to war-time conditions; the point was how to get rid of the defects. Ordinary spotting was of no use, as the most prominent of the spots came in the high-lights of the picture, so another plan was tried. A very sharp-bladed penknife was taken, and the film very gently scraped away, the blade being kept almost in the true vertical position. A very few touches began to remove the worst of the trouble. The paper on which the prints were made was of the smooth platino-matt variety, and it was found that the little knife-work hardly showed on the surface of the print at all; in fact, it could only be observed by the closest scrutiny, and though the part was left slightly lighter in tone, a few touches with a soft BB retouching pencil soon put matters right.

A lot of spotting has a very detrimental effect upon the surface of a print, or enlargement, and is not nearly as effective as the plan mentioned above. I afterwards tried the same method on an enlargement with a semi-glossy surface, and found it in every way successful for lightening some over-assertive shadows. Two hints may be given. Have a very sharp knife, and a very light touch. It is best not to confine the scraping too much to the small area required, as in this case the finished result is apt to look patchy.—Expert.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications for Patents, May 27 to June 8.

Coating.—No. 8,851. Method of coating photographic sensitised glass. L. F. and W. Barron.

Development.—No. 9,038. Apparatus for automatically developing and fixing photographs. A. E. Dufour.

Cameras.—No. 8,946. Photographic cameras. T. Litchfield and Newton and Wright.

Shutters.—No. 8,947. Camera shutters. T. Litchfield and Newton and Wright.

Cinematography.—No. 8,850. Machines for printing cinematograph films photo-mechanically. J. E. Thornton.

Cinematography.—No. 8,838. Pocket and portable cinematograph. M. McAdam.

Easels.—No. 9,065. Photographic easels, printing frames. H. W. Moyne.

Cinematography.—No. 9,204. Taking and projecting cinematograph pictures. W. T. Coulson.

Colour Photography.—No. 9,436. Colour photograph in film and method of producing the same. Hess Ives Corporation.

Carbon Printing.—No. 9,293. Pigment or carbon printing by silver. T. P. Middleton.

Cinematography.—No. 9,303. Shutter for cinematograph machines. T. D. Parry.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Photographic Stencils.—No. 115,593. (December 4, 1917). The invention relates to an improved method of producing several copies of manuscript, typewritten or printed matter, drawings, photographs, or the like, and relates more particularly to the method of producing a photographic stencil for use in the reproduction, the object being to enable sharply defined copies to be obtained, either full size or to any desired scale, without the necessity of producing the original matter to be copied on specially prepared material, such as wax sheets, as is in the ordinary stencil processes.

The matter to be copied (which is produced in the usual manner upon any suitable material), or a photographic negative taken therefrom, is exposed in front of a thin film of sensitised gelatine having a backing of thin paper. Ordinary carbon tissue may be employed for this purpose.

After exposure, the sensitised film is transferred to a temporary support comprising a waxed sheet preferably prepared by pouring a solution of paraffin wax over a sheet of paper which has been previously coated with gelatine, and the backing is stripped from the film. This is carried out preferably by immersing the waxed sheet and film, in contact with one another, in lukewarm water and then subjecting them to gentle and even pressure to cause the film to adhere firmly and evenly to the waxed sheet. They are then immersed in warm water (at a temperature of about 80° F.), thus softening the film and allowing its primary backing to be stripped off, leaving the film adhering to the temporary support.

The film is then developed in the usual manner in warm water, to dissolve the unexposed parts of the film until a clear photographic negative is produced on the waxed sheet. The negative can then be fixed to harden the gelatine by immersing it in an alum solution.

The sensitised film should be sufficiently thin to form a stencil after the developing process, that is to say, the unexposed parts should be entirely washed away so as to leave spaces between the exposed parts of the film, the exposed parts being held together by the temporary support. The period of exposure of the film should, of course, be controlled so as to obtain a clear and sharply defined negative.

After the developing and fixing process, the stencil film is transferred from its temporary support to a final backing of thin rice paper, lawn, silk, or smiliar material of fine texture, by laying the final backing upon the temporary support over the stencil film and causing the latter to adhere to the final backing. After being allowed to dry, the final backing, with the stencil adhering thereto, may be stripped off, leaving the temporary support clean and ready for further use.

The stencil is then ready for use, and any number of copies may be taken therefrom by any of the usual copying processes.

When a rotary or similar copying apparatus is employed, the stencil is placed with its final backing in contact with the inked surface of the absorbent inked roller or platen so that the ink will penetrate through the backing and through the spaces in the stencil, copies being taken in the usual manner by applying the blank sheets to the face of the stencil.

The foregoing process is particularly adapted for reproducing manuscript or drawings, as the latter do not require to be produced on specially prepared material.

The process also enables enlarged or reduced reproductions of the original to be obtained by the use of the usual enlarging cameras, the thin sensitised film being either substituted for the ordinary photographic plate or film, or exposed behind a negative obtained by ordinary photography.

If desired, photographs, pictures, maps, or the like may be reproduced in half-tone by interposing a half tone screen between the original or photographic negative and the sensitised film.

Coloured reproductions may be produced by the use of colour screens during the exposure of the sensitised film or when obtaining photographic negatives of the matter to be reproduced, the different stencils thereby obtained being used successively for printing the reproductions in the various colours required. Sydney James Waters, Blenheim, Chestnut Avenue, Esher, Surrey.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Rhodoid.—No 381,136. Celluloid in sheets, rods, tubes, and similar forms. Societe Chimique des Usines du Rhone, 89, Rue de Miromesnil, Paris, France, manufacturers. December 18, 1917. Address for service in the United Kingdom is c/o Mewburn, Ellis and Pryor, 70 and 72, Chancery Lane.

Alpha.—No. 382,324. Photographic plates (sensitised) and photographic films (sensitised). Ilford, Limited, Britannia Works, Roden Street, Ilford, Essex, manufacturers of photographic plates, paper and films. March 5, 1918.

TRADE MARKS REMOVED FROM REGISTER.

In the official language of the "Trade Marks Journal" the following trade marks have been "removed from the register through non-payment of renewal fees." Such non-payment is of course the method adopted by a firm having no further occasion for the use of a mark.

Zambex.—No. 262,557-9. Registered by R. and J. Beck, Ltd., in 1904 in Classes 1, 8, and 39.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, June 29.

Manchester Amateur Photographic Society. Outing to Marple Hall.

Monday, July 1.

South London Photographic Society. "The Principles Governing the Practice of Photography in Colours." C. H. Oakden.

Tuesday, July 2.

Manchester Amateur Photographic Society. Discussion, "Suggestions Regarding the Work of the Society."

Hackney Photographic Society. "Bromide Enlarging." J. J. Beasley.

Wednesday, July 3.

Halifax Scientific Society. "Unity of Process in Natural Operations." C. J. Spencer.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held on Friday, June 14. Present :—Messrs. A. H. L. Chapman, G. Hana, A. B. Basil, Gordon Chase, Alex. Corbett, C. F. Dickinson, A. Ellis, S. H. Fry, W. E. Gray, R. Haines, A. Mackie, Lang Sims, R. N. Speaight, H. A. St. George, Marcus Adams (Reading), J. W. Beaufort, Frank Brown (Leicester), W. B. Chaplin (Windsor), W. Illingworth (Northampton), and T. C. Turner (Hull).

Letter read from Mr. F. G. Wakefield regretting his enforced absence owing to illness, and referring to his action with regard to the proposed Roll of Honour. The Hon. Secretary was desired to write to Mr. Wakefield regretting his illness and wishing him speedy recovery. The Hon. Secretary reported that he had had an interview with the sub-manager of the Eagle, Star, and British Dominions Insurance Co., and gave particulars thereof.

Luxury Tax.—It was reported that Mr. Edgar Houghton, President of the British Manufacturers' Association, who represented that Association, and also the Photographic Dealers' Association and the P.P.A., had given evidence before the House of Commons Committee appointed to hear the views of the various sections of trades interested in the adjustment of the tax, that he had been cordially thanked by the Committee for so clearly stating the case for those he represented. His contention was that no photographic material should be taxed when used by professional photographers for the purposes of their business, and that no photographs under 42s. per dozen and no enlargements under 42s. should be subject to the tax.

Letter read from Mr. Pelham S. Moffat, Hon. Secretary of the Edinburgh Branch, announcing that Mr. A. Swan Watson had been elected President of the branch.

Letter read from Mr. F. Read announcing that an Association of Master Photographers had been formed for the county of Lancashire, to which he had been appointed Hon. Secretary, and asking for the terms upon which the new Association would be affiliated to the P.P.A. After discussion the Council formulated the terms, and the Hon. Secretary was instructed to notify the same to Mr. Read, and at the same time to express the good wishes of the Council for the success of the new Association.

The Hon. Secretary reported that he had arranged with the Secretary of the Royal Photographic Society for future meetings of the Council to be held at the house.

The draft report was considered on the resolution passed at the last annual general meeting that the Council be requested to consider the practicability of training and employing disabled soldiers and sailors as photographic workers, and to make a report, and after some discussion was passed for publication.

CROYDON CAMERA CLUB.

Some amusement was caused, and not a little speculation indulged in, when the usual seven-day's notice on the club-board announced that Mr. F. C. Reynolds would talk on "National Kitchens." Few appeared to have penetrated the mysteries of these new institutions, some having visions of waiting with a bucket in a queue, and in turn receiving soup or potages of doubtful composition. Next, many wondered what on earth he knew about the subject selected.

No one would care to stand up against him with the foils. As an exponent of polarised light he occupies a special position of his own in the club. Equally special is his experience as a photographer, which has been confined to borrowing a camera on one occasion, taking two negatives with it, and then boldly exhibiting a print from one, which nearly burst into spontaneous combustion on being subjected to whole-hearted criticism from Mr. H. P. C. Harpur. But on the topic chosen he was a dark horse indeed.

The dark horse, however, proved to be a very knowing one on the course of the Grand Nationals, and a thoughtful and excellent contribution was made, most useful in removing any prejudice which may have existed regarding these kitchens, which have worked admirably when well organised, if indifferently when organisation has been imperfect. Mr. Reynolds made many exceedingly practical suggestions on a theme which has more relevancy to the Food Controller's department than to the columns of this journal. A discussion on serious and well-regulated lines followed (most unusual in the club) during which a timely warning was given on the grave danger of becoming cross-eyed owing to the strain of masticating much of the meat on a rationed market. A most hearty vote of thanks was accorded the lecturer.

News and Notes.

PHOTOGRAPHS OF SHELLS IN FLIGHT.—W. Block, in the "Central-Zeitung für Optik und Mechanik," January 20, describes a method of photographing shells in flight by a cinematograph camera having a specially broad film. The film moves forward in jerks, the photographs being taken when it is stationary, through a rotating screen having thin slits cut in it. The length of exposure is varied by varying the width of the slits. Since, however, the time between the successive stationary positions of the film is too great in comparison with the rate of motion of the shell, numerous slits are cut in the screen, and several exposures are made on the same portion of the film so as to show the projectile in various stages of progression.—*Nature*.

ANGLO-AMERICAN COPYRIGHT.—Mr. H. S. J. Booth, writing to "The Times," chiefly in reference to musical works, makes the following suggestion for facilitating mutual copyright protection between this country and the United States: "I note in your issue of May 30 a memorandum drawn up by the Authors' League of America suggesting that the formalities required to secure copyright in the United States of America for British publications and copyright in Great Britain for American publications should be deemed to have been complied with by filing a claim for copyright protection at the respective Embassies or Consulates of the two countries on condition that they complete the usual legal formalities within six months after the end of the war. May I suggest that we should go much further than this, and that American copyright for British works (literary, musical, etc.), and British copyright for American works should in future be obtainable by regarding the respective Embassies or Consulates as the territory of the respective countries, and allowing the necessary formalities of publication, deposit (or registration) of copies, etc., to be made at the American and British Embassies or Consulates instead of requiring them to be effected in America and in Great Britain? The war is sweeping away many bonds of red tape; the time should be ripe to make it easy and simple to establish international copyright between England and America without the troublesome and expensive formalities which are now necessary and which are not necessary in the case of international copyright as between France and England."

COSTS.—The reminders contained in the following lines apply in every instance as much to the photographic business as to that of a printer, for which they are offered by the "Typothetæ Bulletin," as quoted by "The Process-Engraver's Monthly." Photographers who are at a loss to fix remunerative prices for their work may be well advised to ponder these many items which enter into the cost of the output of a portrait or commercial establishment:—

It costs money to make money. It costs money to conduct your business—to do every single operation in your plant. You can't make money by repeatedly losing it.

It costs money for rent.
It costs money for wages.
It costs money to deliver goods.
It costs money for postage.
It costs money for printed matter used in your business.
It costs money for advertising.
It costs money for insurance.
It costs money for bad debts.
It costs money to have periods of no work.
It costs money to have periods of less than full production.
It costs money to pay interest.
It costs money for taxes.
It costs money for water.
It costs money for light.
It costs money for heat.
It costs money for power.
It costs money to pay yourself a salary.
It costs money for materials.
It costs money for petty charges.
It costs money to neglect to take all cash discounts.
It costs money to have money invested in plant.
It costs money to have money invested in fixtures.
It costs money to have plant and fixtures wear out.
It costs money to waste time.
It costs money to waste materials.
It costs money to collect money.
It costs money to replace breakage.
It costs money for advice, from lawyers or auditors.
It costs money for charity, donations, subscriptions, etc.
It costs money for telephones and telegraphing.
It costs money to keep your premises clean.
It costs money for your own office supplies.
It costs money to have goods lost, damaged, or stolen.
It costs money to send out goods without charging.
It costs money for allowances made to customers.
It costs money for wrapping paper and cord.
It costs money for cartage, freight, and express.
It costs money for repairs and upkeep.
It costs money for mistakes and errors.

It costs money to figure out your costs without taking all the above items into your calculations, and then some which perhaps have been overlooked.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

CO-OPERATIVE CLOSING OF SHEFFIELD STUDIOS.

To the Editors.

Gentlemen,—I, as a professional photographer, very fully associated with any good thing accruing to one's fellow-workers as a body, would like to know what advantages would attach to the wholesale closing of Sheffield studios for a week. I know one firm whose employees are distinctly satisfied with the privileges extended in the matter of holidays, practically leaving them the choice of their own date, and this without in any way clashing with the best interests of the firm, thereby enabling them to keep open and conduct business as usual, which I consider is greatly to the advantage of the employees in the knowledge that the firm is not in any way suffering inconvenience.

It appears to me somewhat arbitrary, as all of us are not desirous of taking our holidays at one and the same time, and the firm I have in mind has already commenced the holidays of its employees under the usual system.—Faithfully yours, W.

Sheffield, June 24.

CO-OPERATIVE CLOSING AT KEIGHLEY.

To the Editors.

Gentlemen,—It may interest you to know that, following in the wake of Edinburgh, we, the photographers of Keighley (three out of four), have decided to close our several establishments from July 29 till August 7, inclusive, for the holidays.—Yours faithfully,

Hall and Siggers.

Cavendish Street, Keighley.

CO-OPERATIVE HOLIDAY CLOSING AT NORTHAMPTON.

To the Editors.

Gentlemen,—About a twelvemonth ago you kindly published particulars of our *then* projected holiday week in August, and of the loyal co-operation of my fellow-craftsmen in supporting the scheme.

All the local and some of the district photographers closed their studios, as arranged, the whole of the Bank Holiday week in August, to the mutual help and advantage of employers and assistants.

Thanks to your timely insertion of my letter and support of the scheme, other centres followed Northampton's lead, and I am hoping that when photographers know how, by a little pre-organisation and personal sacrifice, the co-operative holiday movement may become an accomplished fact, more will avail themselves of the suggestion.

The enclosed paragraph from the "Northampton Chronicle" will show that this time we are moving early in the matter, and enlarging the scope of our experiment by including adjacent towns. We are giving our patrons and the public generally a long notice of the arrangements, so that disappointment and inconvenience may be reduced to a minimum. I shall be pleased to advise any of your correspondents who are interested as to how to proceed if they wish to follow suit.—Thanking you, yours faithfully,

S. H. Greenway.

The Studio, Abington Street, Northampton.

[The following is the paragraph referred to by Mr. Greenway :—

"At a meeting of local and district photographers held at Franklin's Hotel, Northampton, it was unanimously decided to close all studios for business during the August Bank Holiday week, as was done last year. Particulars will be duly advertised, and it is hoped that this early announcement will reduce the inconvenience of the public to a minimum.

"Mr. S. H. Greenway, as the originator of the combined holiday scheme, was voted to the chair, and announced that several other places had followed Northampton's lead in the matter, to the mutual advantage of employers and assistants."—Eds., "B.J."]

COLOURING AND TINTING PRINTS.

To the Editors.

Gentlemen,—Permit me to thank you for publishing the article under the above title in your issue of 21st inst. It is one of the most helpful I have read for many a day, even though I am a colourist of some experience and up to most of the tricks of the business—and of the colours themselves. There is, however, one point to which I would like to draw attention, particularly as Mr. Davis appears to have missed it.

Many books and articles written by the less experienced men often recommend hardening the film of gelatine papers and lantern-slides—more particularly the latter—before colouring. It has been pointed out that a gelatine film hardened in an alum bath is less liable to damage while colouring, while hardness prevents to a certain extent excessive colouring; in other words, the colours do not so readily soak in, and any errors in colouring are more easily and more safely removed from the hardened film.

In theory the above appears to be correct, but when aniline colours are to be employed an alum hardening bath should on no account be used, as a trace or substratum of alum interferes with the purity of aniline colours and alters the tints of some of them very considerably. The change may not be seen for a few days, but I have known some of the red dyes of commerce to change to orange or yellow a few hours after being placed on the alum-hardened film. The changes are bad enough on gelatine prints, but on slides they are at times very startling and unlooked for. The acid-fixing bath will also under certain conditions—unknown to me—produce a support of gelatine that will play tricks with colours. I have found that an alkaline-fixing bath gives the most perfect base for colouring, the necessary alkalinity being secured by adding a few drops of soda carbonate solution to the fixer, and then washing the film very thoroughly.

The pre-war dyes varied very considerably, some brands changing more than others on an alumed surface. It is to be hoped that a new era of dyes has commenced and that someone with a knowledge of photographic colouring will produce a perfect set of dyes. When the war broke out I had an almost perfect set of aniline colours, but they were not purchasable as a set. After some experiments I found that, say, the blue belonging to a set sold by one maker was the best blue obtainable, but the perfect red and yellow came from the set sold by another manufacturer, while the green came from yet another, and so on.

I have not yet employed British-made dyes for tinting, but those who have, speak well of them, though the "set" system—as in pre-war days—does not appear to be satisfactory. Single colours and in smaller quantities should be more easily obtainable, as to purchase sets for the purpose of getting one or two good colours is an expensive hobby.—Yours faithfully,

Colourist.

THE USE OF THE BEE METER.

To the Editors.

Gentlemen,—I had given up expecting Mr. Bitter to reply, but it takes quite a while to make the double journey to Philadelphia.

In the matter of light-testing it is only sometimes one can take the meter to the subject and meter the shadiest part, and if that is done all the rest will be over-exposed. The whole matter of exposure is one of compromise. Mr. Bitter makes his one way. I make mine in another.

I noticed some of the misprints and read with correction as most people would, but is there not a misprint in Mr. Bitter's index to his illustration? "A. Light ahead *all shadows falling towards the camera.*" (The subject will be wholly in the shadow.) "D. Flat light *with subject wholly in shadow.*" I cannot understand it as printed.

In my last letter I fear I tried to compress it into too small a space and so made things less clear.

The manner of Mr. Bitter's use of the meter is evidently to hold it so as to get full sky-light or direct sunlight on it. The subject is sure to be over-exposed unless it receives the same kind of light. Hence his method of somewhat laboriously rectifying his error.

My method is to let the light fall on the meter exactly as it does on the subject, and correction is therefore not required. Of course there are fully lighted and partially lighted parts in all landscape subjects, calling for compromise, which is here automatically supplied. Take for example a landscape on which we will draw a large (imaginary) clock-dial: at the centre is the subject: at 6 o'clock is the camera. From whichever direction the light comes the meter will look along the line from subject to camera. Light from 10 or 2 o'clock plays on back of meter and it is only darkened by diffused light. All stronger lights but 6 o'clock call for a shorter exposure than the 6 o'clock light, which is the one light calling for pointing the meter at the sun.

I submit that the compromise is here made in a simpler and more correct way than Mr. Bitter proposes.

How do I know that my exposure is correct? I use a Newman Sinclair shutter, English made, the speeds of which are not only certified but ascertained at the National Physical Laboratory. It is practically a Government guarantee of correctness. I do not know a better shutter for a hand-camera.

The last exposure I developed was made on a recent Saturday at 4.30. Light metered in the manner described was "A 6." The sun was at 4 o'clock. The just exposure for f/7 was 1/130 sec. I stopped to f/8, for which the exposure was 1/90 sec. and gave 1/100. It is just a good printing negative with a suspicion of thinness. The plate was Lumière violet label (Watkins 500). The developing was in a Watkins tank with Watkins formula, M.Q., and by Watkins thermometer. So far as one exposure goes this is as correct a test of the metering as may be.—Yours,

Oliver Horton.

Glasgow, June 24, 1918.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

E. G. PASCAL.—It is not a popular lens. Value to direct buyer about £2 to £2 10s.

ALBERT HAYES.—The vignetter is, or was, made by Messrs. Wahltuch Smith and Co., 30, Chapel Street. Salford, Manchester, under the name of the "Bram."

E. G. PASCAL.—We should say the seating of the mirror has been put out of truth. If you are not able to re-adjust it yourself, better take it to a firm of camera repairers such as Messrs. H. T. Bale, 51, Berwick Street, Oxford Street, W.1.

ADON LENS.—I shall be very much obliged if you can tell me the focal length of each of the two components (positive and negative) of the Adon telephoto lens, early type.—A. H.

The positive lens of the original Adon had a focal length of 4½ inches, and the negative lens a negative focal length of 2¼ inches.

ROSS LENS.—I have a Ross Rapid Symmetrical $f/8$, iris mount, apparently a W.A. as lenses are very small; it is marked 3 by 3, which I presume is not meant for size of plate. Can you say what size plate it was intended to cover and whether a W. A., also original price and about present value.—B. BRASSUM.

Impossible to say, as you give us no idea of the focal length, but apparently it is not a wide-angle rapid Symmetrical, the maximum aperture of which was $f/16$.

DAGUERREOTYPE.—Would you mind informing me if it is possible to produce now a Daguerreotype and what book gives the best practicable working and where the best specimens are to be seen.—DAGUERRE.

Certainly it is possible, but you will require to make apparatus for iodising and developing the plates. There are no books now in print on the details of the process. You had best look up text-books such as Hunt's of the years 1850 to 1860 in the Patent Office Library, 25, Southampton Buildings, open 10 to 5.

AUTHORITY TO PUBLISH.—I am under the impression that we are obliged to submit every local view, intended for publication as picture postcards, to some Government authority to receive its sanction that such views may be so published. Would you kindly say if this is so, and give the address, etc., where I must send my views for approval?—HARROW.

You are not compelled to obtain authority beforehand, but if the photographs include anything which conceivably might be of military value, it is just as well to submit them. The office is the Official Press Bureau, Whitehall, London, S.W. You should send each photograph in duplicate with your name and address on each.

S. F.—We take it that you have not supplied the goods; therefore, obviously, you cannot sue the lady in the county court for the full debt. You could only sue her for a sum representing the cost of the sitting, and in order to do that it would be necessary for you to be able to show by the quotation of a specific sum to her or from your ordinary price lists what is your charge for a sitting in the event of photographs not being subsequently ordered. It seems to us that you must either give up the idea of getting any payment from the lady or else you must supply her with the goods, and if she does not pay for them, then sue her in the county court. In the latter case it would be of the first importance to be able to prove that she gave a definite order, preferably in writing.

B. D.—There is little to gain from a combined formula, but we give you the following as a reliable one :—

A.—Hydroquinone	160 grains.
Soda sulphite	2 ounces.
Water	20 ounces.
B.—Metol	130 grains.
Soda sulphite	3 ounces.
Water	20 ounces.
C.—Soda carbonate (cryst.)	3 ounces.
Water	20 ounces.

For an M.Q. formula take equal parts of A, B, and C. If plate is likely to be under-exposed, use half the quantity of A; if likely to be over-exposed, use twice as much of A, and add a few drops of 10 per cent. bromide solution to every ounce of developer.

For hydroquinone alone (lantern slides), mix equal parts of A and C; add water if it is found that the results are too black-and-white. In making up B it is necessary to use the genuine metol (Metol-Johnson's), as the metol substitutes are not sufficienly soluble.

N. N.—Potass. metabisulphite added in any quantity to the accelerator solution does considerably slow down the developer, and, we think, reduces its activity, even if a longer time of development is given. We are surprised that you got pyro stains with your boil the mixture for a minute or two? If you do that, we think which the A solution was mixed. Did you dissolve first the sulphite and then the metabisulphite in fairly hot water, and then boil the mixture for a minute or two? If you did that, we think you will find that the developer works without any stain, though it certainly is a little slow, and may call for somewhat more exposure than an ordinary pyro-soda formula, but not enough to make any material difference to the studio exposures. However, the extra half ounce of soda carbonate in your second formula should be ample to compensate for the metabisulphite. You omit the pyro in giving your second formula, but we suppose it is in quantity to bring the strength of pyro to the same amount in the working developer as in the old formula. If this is so, we cannot see any reason why the new formula should work more slowly and give negatives the appearance of under-exposure. If we were in your position we should think that the way out of the trouble would be in boiling the A solution of the old formula.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as the acceptance of "returns" by a publisher is now prohibited by the Government. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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SUMMARY.

In a leading article we deal with the very valuable yet simple means which can be taken in the printing-room for the improvement of negatives by the application of paint to the glass-side. Practical details of the manipulation are given, and possess the recommendation that they are those employed for many years past by a leading firm in the printing from photographers' negatives. (P. 302.)

An electrical appliance for the momentary over-running of metallic filament lamps, for the purpose of obtaining high actinic intensity for an instant, is described in an article which we quote from "Camera Craft." The method scarcely bears out the claims of its author as regards economy, but it may have its application in exceptional circumstances. (P. 303.)

At the Croydon Camera Club last week Mr. Angus Basil delivered a most interesting talk on his methods and aims in portraiture (P. 306.)

The Professional Photographers' Association has entered into arrangements with the R.A.F. for the supply of photographers for the photographic service of the latter. The arrangements are not yet complete, but preliminary details will be found on p. 304.

An interesting example of the use which can be made of photography as legal evidence is afforded by a recent incident quoted in a Rochester newspaper, where a person alleged to be permanently crippled was, it is alleged, shown to possess his normal powers of walking in photographs surreptitiously taken of him. (P. 307.)

Some practical notes on the chief factors for success in sulphide toning form the current instalment of the Rajar trade publication. (P. 304.)

The home-making of cut-out mounts, printing from stained and dense negatives, the use of hydroquinone caustic developer, and the making of an illuminated window sign are the subject of "Assistants' Notes." (P. 305.)

"Colour Photography" Supplement.

Dr. T. W. Kilmer, in the course of a warm appreciation of the Autochrome process, which we reprint from "Photo-Era," touches upon maximum naturalness of effect which, for each individual, is obtained by the use of a given focal aperture. His remark is made in reference to soft-focus lenses, and is intended, apparently, to apply to ordinary black-and-white photographs. (P. 25.)

By courtesy of the Ilford Company we publish spectral sensitiveness curves (actual spectrographs) of the new colour-sensitising dyes: also absorption spectrographs of dyes for compensating light-filters and safe-lights. (P. 28.)

In the current instalment of the "Decennia Practica" of colour photography particulars are given of the processes of making colour-screen plates according to the pattern of Palmer, Spath, Szczpanik, and the Vereinigte Kunstseide Fabriken. (P. 26.)

EX CATHEDRA.

Legal Photographs. News of a very interesting use of the camera in legal proceedings is contained in an extract from the "Rochester Democrat," which a correspondent sends to us, and which we print on another page. It appears that action was brought against a company owning a departmental store by a person who claimed to have sustained serious injuries by tripping over a trap-door in front of the store, and who, in respect to these injuries, was awarded very substantial damages by way of compensation. The verdict of the court was subsequently confirmed by a higher court to which the defendant company appealed. Evidently, the defending counsel had their own strong convictions, for immediately after the appeal judgment they hired a motor-car equipped with a battery of cameras and tracked the plaintiff round the city, obtaining photographs which, it is claimed, show the plaintiff as walking normally erect and showing an extreme contrast to the hopelessly-crippled appearance which he presented in court. On the submission of these photographs to a still higher court an order has been granted, on the strength of the evidence contained in them, directing the plaintiff to show cause why a new trial should not be granted. The incident is one in common with others which have come before our notice evidencing the greater degree of readiness shown by judicial authorities in the United States to accept photographs as legal evidence in comparison with the attitude towards them of judges in this country. There was a case some year or two ago, again in an American court, where a photograph served, in conjunction with personal evidence, to prove an alibi by its record of the position of a shadow on a church wall. The person concerned figured in the photograph and the position of the shadow provided important evidence as to his presence there at a time when, according to other evidence, he was somewhere else.

* * *

Step Actinometers. Mr. Braham's letter, which we print elsewhere, rather questions the desirability of making the scale as steep as is done by doubling the exposure at each step. In cases where a comparatively limited range of tones is required his scale is certainly more useful, but in comparing such things as plates or bromide papers a steeper graduation is often necessary. This week we had occasion to test two packets of the same make and grade of paper, and found that the contents of one packet required twelve times the exposure of the other; while, of course, it is conceivable that a much longer scale than this might be necessary, when either the scale must be of a considerable length or the steps must be very narrow, neither of which conditions are desirable. To take an ordinary problem, it is desired to know the ratio between an "ordinary" plate to be used for making an enlarged negative and a bromide paper of which the operator knows the correct exposure. Here one may require twenty times or even more than the other, and then it is desirable that there should be a little margin so that the two extreme ends of the scale should not have to be compared. As a matter of economy it may be pointed out that as a rule the test strip, which need not be more than half-an-inch wide, may be cut from the actual plate or paper to be used. In nine cases out of ten the proportions of the negative and enlargement are not the same and a portion has to be trimmed off. It is important to use a non-staining developer such as amidol or ferrous oxalate for making an actinometer, as the yellowish image produced by the pyro-soda developer would not be suitable for comparing a colour-sensitive plate and an ordinary one, the screen factor of the pyro stain being a disturbing factor.

PAINT ON THE BACK OF NEGATIVES.

Many photographers who aim to turn out the highest quality work are apt to regard the negative as an unalterable product directly it leaves the retoucher's hands (a fact to which we referred a week or so ago), and from that moment the printer is expected to furnish the best possible prints, and by shading and dodging to obey any instructions which may appear on the negative bags as to holding back some parts or accentuating others. Shading during printing has its limitations, and often a touch of paint on the back of a negative may save a lot of trouble, and prevent a Platinotype print solarising in deep shadows, or their choking with carbon or bromide papers; in fact, it may make all the difference between the production of a good and a bad print. To institute a rough retouching desk in the printer's room may seem an unnecessary duplication, but it is not so, unless the retoucher is close at hand to do the needful, and even then he or she may reasonably chafe if subjected to interruption. The printer will soon appreciate the advantage of being in a position to control the prints at the source, instead of being compelled to dodge every print of a large batch from the same negative, especially as it will be found that waste of time and material is materially reduced. These remarks apply with special force to the trade printer, who has to deal with negatives of the most varied, and occasionally appalling, character and is often expected to achieve the impossible. An efficient desk can be improvised on familiar lines out of a large picture-frame fitted with two fixed struts at the back, and a horizontal cross-piece let in a few inches up to hold the negative. It is preferable to rebate the cross-piece, and, after cutting down the glass, to glaze the upper part of the frame. A sheet of white blotting-paper answers as a reflector. In most cases before a negative is proofed in the process in use, it is not easy to say whether it will require paint or not, and in any event a print is of value as a guide to the depth of pigment to be applied.

There are many well-known methods of working on the back of the negative, the oft-recommended device of covering the glass with tissue paper, or *papier minerale*, and working thereon with pencil or stump, being seldom employed by professionals, possibly because it is troublesome, has a tendency to transmit the grain of the paper and handwork, and unduly slows printing. Matt-varnish, plain and tinted, with pencil work, etc., is a favourite, as it permits of local printing-up by scraping away portions of the varnish. Apart from any question of "control," many photographers, who produce negatives of a fairly quick-printing character, invariably matt-varnish them, claiming that prints of better quality result. The air brush is sometimes used, and is very good for the purpose, particularly for vignettes, but the majority apply water-colour paint, either with a brush for the hair, or by dabbing it on with the fingers over larger areas of appreciable printing density which are required white in the print or with a mere indication of a tint. Beyond that the paint is apt to afford a decided mottled deposit.

The simple method now suggested, whilst not new in principle, may have some minor point of novelty, though no originality is claimed for it. It has appealed to many photographers to whom the procedure has been shown, it is certainly practical, demands practically no skill and has been employed for many years by the printing department of a well-known firm on thousands of negatives printed by single and double-tube mercury lamps.

The materials required are one or two "fitch-hair dabbers"; a tube of "students' gamboge-tint" water-colour; an ordinary water-colour brush, and some good quality gum. For small work Nos. 13 and 14 dabbers (quoting Reeves and Sons' numbers) are suitable but if large spaces have to be covered evenly, a No. 16 dabber should be purchased.* The use of yellow instead of the usual crimson (containing a large proportion of blue) is recommended, because for a given light-stopping power it hides the image less, a factor of importance when paint over parts not required to be covered has to be removed, and, where maybe, the outlines are none too easy to follow.

The way of working may best be illustrated by taking a familiar example. Suppose a patch of hair full of detail, and with fluffy hairs against the background, requires holding back to prevent the detail being buried. Here no suggestion of hair is required by brush drawing as would be the case if detail were absent, but merely a level tint of pigment applied to allow such detail to appear in the print. A small quantity of paint is taken, mixed with a little gum, and put on roughly with a brush, and then the dabber operated in the manner indicated by its name, dabbing with gradually decreasing pressure until the mixture is set, and paying no attention to the outline. The thinner the application of paint the more gum is required, and *vice versa*. When quite dry (in very damp weather it may be necessary to warm the negative slightly) the outline is gone round with a "pen print trimmer" inserted in a mapping-pen holder, and a narrow band of paint is scraped away. The stray hairs present no difficulty, for by fine strokes of the trimmer they can be vignetted into the background. The paint left outside the band is then removed with a damp rag, and this perhaps, is the more quickly effected if the negative be held in the hand, using reflected light.

Large areas of shadow can be evenly held back in the same way, and in cases where as level a tint as possible is required, where the dabber becomes charged with pigment a dry one should follow; the palm of the hand will be found the best medium for removing surplus paint from the dabber. Although very even tints can be applied, yet if the shadows are of nearly clear glass and the paint is put on thickly, there is a tendency to mottling in the print. If a distinct deposit exists over the shadows, this acts as a diffuser and such tendency is minimised, but it is not suggested that, say, a coat normally printing a deep black can be converted satisfactorily into a grey one. Neither can a vignetted background which prints dark be changed, as a rule, into an even-tinted light one, but if it only prints a little on the dark side this can be corrected easily. Thick glass allows heavier applications than thin, and a bound-on cover-glass permits of far heavier work; printing under ground-glass is also of obvious assistance.

---

* These can be obtained from any artist colourman. Prices are fluctuating and stocks are diminishing. Messrs. Reeves and Sons, of Ashwin Street, Dalston, E.8., quote at the time of writing:—Nos. 13, 14 and 16 respectively: 1s., 1s. 4d. and 2s. 4d. D4 tube of Students' Gamboge 1s., which is the most economical size.

It is a simple matter to graduate the colour laid on, particularly useful when figures come close to the edge of a negative to be vignetted on larger paper. When necessary, opaque can form a continuation without any line of demarcation showing which finishers object to. As a "stop" for vignettes a graduated band can replace cotton-wool, and even more effectively, as the paint can be graduated up awkward shadows and prevent their catching up during printing, any paint straying over adjacent parts being scraped away with the trimmer. The shadow side of a face is also susceptible to the same treatment, the trimmer vignetting the junctions to lighter tones as previously mentioned. With over-developed landscape negatives the method often spells salvation, and it is not too much to say that impossible printers may be transformed into first-rate ones. Owing to the usually, broken character of the image frequently quite rough work suffices, and with large negatives on thick glass ordinary hog's-hair stencil brushes have been employed as dabbers. A small stencil-brush will often be found useful as a rough smoother prior to the application of the dabber. Finally, a word of caution—flies heartily enjoy an unrationed repast of the paint, and exhibit no symptoms of jaundice as might be expected from its colour.

AN ELECTRIC FLOOD LIGHT.

[We reprint the following portion of a contribution to our contemporary "Camera Craft," not because there is anything essentially novel in the method, nor for the reason that it is of any but exceptional applicability, or has (at the present time, at any rate) the economical features which the author claims for it. It does, however, describe a construction of electrical resistance which in an emergency may be utilised for obtaining a very high and actinic illumination from a comparatively small number of the ordinary metallic-filament lamps. The idea of over-running both carbon and metallic-filament lamps for the purpose of producing a higher candle-power and greater actinism is by no means new, and is probably familiar to most photographers. Various schemes based on this plan have apparently died owing to the introduction of the half-watt lamps. The same idea is applied to battery metal-filament lamps in small cinematograph projectors, but here the filament of the lamp is much stouter than that of lamps of higher voltage and therefore resists better. Moreover, a nuisance with over-run lamps is the rapid blackening of the bulbs. The method of focussing with a resistance inserted and short-circuiting it at the moment of exposure was first suggested by Mr. E. A. Salt in application to half-watt lamps at the time of their first introduction and for the purpose of prolonging their life and reducing the radiant heat. But the most evident criticism for which Mr. Palme's article calls is in reference to the price of the outfit. The eight lamps which he puts down at the figure of 2 dollars, say, 10s. cost at the present time about 3s. apiece, and his system will therefore be more expensive in the end than the fitting of a half-watt lamp. Nevertheless, in an emergency where a half-watt is unobtainable and a light of great intensity is needed, his method, considered as an improvisation, is worthy of consideration.—EDS. "B.J."]

SUPPOSE you have a 40-watt Mazda labelled for 110-volt, and you want to take an indoor portrait with the light of this lamp, which gives about 35 c. p. "It can't be did," unless you freeze up your poor sitter, and expose for a minute. And you won't take a flash-light, and you have no other lamps. There's your emergency case.

You would be surprised how much more light you can get out of your one Mazda lamp *if you only disregard its label and feed in the lamp, instead of* 110 *volts, say*, 150 *volts*. With increase in voltage the candle-power of a Mazda lamp increases at a faster rate, and, consequently, for a given current consumption a great quantity of light is obtained by operating at a voltage higher than normal. For example, if a Mazda lamp is operated at a voltage only 10 per cent. higher than the voltage rating appearing on the label of the lamp, the electrical consumption is increased only about 16 per cent., while the candle-power is increased 37 per cent. Of even greater importance to the photographer is the fact that the actinic (silver reducing) effect grows even more rapidly. A 10 per cent. increased voltage gives a light of 50 per cent. more photographic actinic value.

Upon this very little known fact all the rest of this article is based.

Your first question will naturally be: How can I raise the voltage of my house-lighting circuit? This would be possible with a small, inexpensive transformer, but it would be possible only on alternating current.

It is by far simpler to achieve this in another and still cheaper way. Any large electric lamp factory can sell you Madza lamps for 65 volts. A small self-made resistance will enable you to supply these lamps with either their normal voltage of 65 volts or any higher voltage up to 110 volts.

And now that the principle is explained, let's go down to brass tacks and build an inexpensive flood-light—one that will enable you to obtain most pleasing photographic effects with remarkably short exposures.

In order to give definite figures, I shall describe in the following the flood-light which I actually built for my own use. Of course, it is left to the ingenuity of the reader to make any alterations or improvements that he may see fit for his own special purpose.

Five five-inch boards were put together to make a four-sided hollow frustum. Another board nailed to the bottom of one of the sides will make it stand vertically (see fig. 1). The entire inside of the frustum was painted white. On the inside of this four-sided reflector are mounted eight electric lamp sockets, all connected in parallel. In every socket is screwed a 50-watt 65 volt Mazda lamp. On one of the outside boards is fastened a rheostat, built as follows:—Cut off one foot length of a 1½-inch fibre tube or a broom-stick, and cover it its full length with a layer of asbestos paper, such as used for covering hot air furnace pipes. Wind on this insulated tube about 50 turns of .035 inch German silver wire, which will require some 20 ft. The beginning and the end of the wire are held firmly by copper clamps. The resistance of this rheostat will be such as to feed the eight lamps in parallel with just about 65 volts of rated voltage if connected in series with them and applied to 110-volt mains. The current consumed by this circuit will be about 7 amperes, giving approximately 350 c. p., sufficient light to focus by. Now place a third copper clamp on the rheostat and determine its proper location for giving 90 volts to the lamp circuit. This can

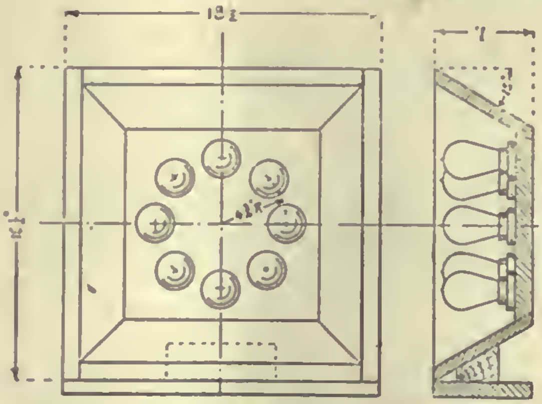


Fig. 1.

best be done by borrowing a reliable voltmeter from your local electric company. The third copper clamp and the beginning of the resistance wire are connected to a push button, as shown in the wiring diagram (fig. 2). By pressing this button the greater part of the resistance is short-circuited, and for an instant 90 volts are applied to the lamps. This will cause a flare-up of the lamps to some 1,500 c.p. In this moment you may release the shutter on your camera. Working with a lens aperture of *f*/4.5, using a fast plate—as, for example, Cramer's Instantaneous Iso—an exposure of 1/5th to 1/10th of a second will give a well-exposed negative. If greater diffusion or softer effects are desired a piece of tracing cloth may be pinned in front of the flood-light. This will cut down the amount of light, and will require a somewhat longer exposure, but it will still be within a second, which is not too long for adult sitters.

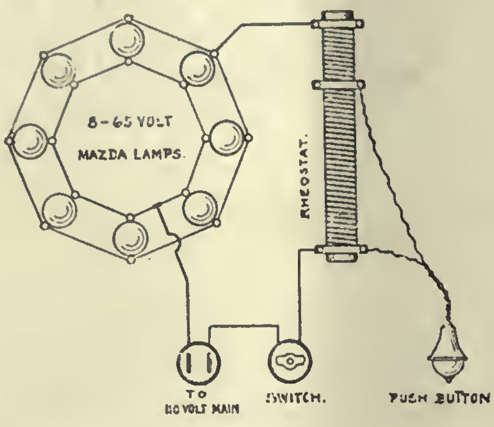


Fig. 2.

It is important to mention that the recommended size of the resistance wire has been chosen to give small bulk to the rheostat. The wire will as a consequence soon heat up, and it is not advisable to use it longer than, say, ten minutes. But I have never found it necessary to let the light burn for a longer period.

Whatever voltage lamps you may choose to use, I would not advise you to operate them at more than 135 to 140 per cent. of their rated voltage, that is not more than 90 volts for 65 volt lamps. In this connection I want to say a few words about the life of Mazda lamps. Burnt at rated voltage the manufacturers' guarantee a life of about 1,000 hours. It is obvious that operating a lamp at higher than rated voltage must be detrimental to its life. As a matter of fact, only 10 per cent. higher voltage brings the life of a lamp down to only 300 hours. At 35 per cent. higher voltage the lamp will last probably an hour or two. But this sad fact is really of no great importance for the amateur. Assuming that it is necessary to have the lamps on high voltage (with depressed button) for one second for each exposure, one set of lamps will be good for an average of 100 exposures. With only 25 per cent. over-voltage, giving in our example over 1,000 c. p., the lamps will last about ten hours.

The cost of the flood-light was as follows:—Carpenter work, $1.50; eight sockets, $0.80; eight lamps, $2.00; rheostat, $0.50; switch, $0.25; plug, $0.25—complete, $5.30. Weight complete with cables, 18 lbs.

Compare this amount with the cost of an equivalent 1,500 c. p. outfit rated and operated at 110 volts, and you will find a saving of considerably more than half. ARTHUR PALME.

TANK DEVELOPMENT FOR BARNET PLATES.—Professional users of the Barnet "Studio" and "Super-Speed" plates will thank the makers, Messrs. Elliott and Sons, Ltd., Barnet, Herts, for their issue of a leaflet of instruction for the development of these plates by time in a tank. The leaflet gives two alternative developing formulæ, azol and pyro-soda, and contains some useful hints on the avoidance of air-bubbles and stains in the development. We can advise professional photographers to send for a copy of the leaflet. It is sent post free on receipt of a postcard.

PHOTOGRAPHERS AND THE ROYAL AIR FORCE.

AT a conference, on June 28, at the headquarters of the Royal Air Force, between Major Maxwell, representing the Photographic Section of the R.A.F., and Messrs. George Hana and Marcus Adams, representing the Professional Photographers' Association, it was agreed that the organisation of the P.P.A. should be utilised for the purpose of securing a supply of photographers for the Royal Air Service, and that an arrangement be made under which photographers may be provided through the P.P.A. with authority to be passed direct to the place of reception for R.A.F. photographers on entering military service.

The arrangements are not yet complete in detail, but the general requirements and conditions of the service are as follows:—

1. The Royal Air Force is urgently in need of photographers. They will be taken on at about the rate of a considerable number per month during the ensuing three months.
2. No Grade I. men are passed for photography. Grade II. men are preferred, but in some cases Grade III. men will be accepted.
3. Men with professional photographic experience are preferred.
4. Cinematograph operators, film developers, and film joiners are urgently required.
5. No demonstrators or instructors required.
6. The greater part of the work consists in printing and enlarging, and in developing and titling negatives. Other duties consist in filling slides and getting cameras ready, fixing the same in the machines ready for the pilot to pull the lever; on the descent of the machine, taking camera out, developing the plates and printing them, and other incidental duties.
7. Photographers are not required to fly.
8. On joining the section all undergo a course of training usually lasting nine or ten weeks, but those exceptionally proficient and quick at grasping the requirements may get through in less time.
9. No rifle practice and only simple drill.
10. Good chance of promotion.
11. No commissions are given to photographers direct from civilian life. When officers are required, wounded officers and men returning from foreign service are chosen.
12. Men in the Photographic Section may be required to go overseas, if physically fit, after six to twelve months' training.
13. Women required, printing and developing, home service. They must join through the W.R.A.F.

SULPHIDE TONING.

(From Rajar "Trade Notes.")

THE method of bleaching bromide prints with ferricyanide-bromide and toning in sodium sulphide is still very popular, and there is no doubt that with proper treatment the results are very satisfactory. The colour produced is usually a warm sepia, whilst that produced by the hypo-alum bath is cold sepia.

There is, however, one point in which the hypo-alum toned print scores over the sulphide toned print, and that is in the purity of the whites.

From experiments made in our own laboratories, we find that in sulphide toning it is not possible to obtain absolute purity of the whites. The degradation is slight, and cannot be entirely eliminated, but it can be minimised by thorough fixation. Prints that were fixed in two separate baths for fifteen minutes each showed very little loss of purity in the whites, and this appears to point to the fact that the degradation is caused by silver being still left in the gelatine or its support.

Varying strengths of bleacher and sulphide did not make any material difference, but it was found that when a print was "forced" in development the whites after toning showed decided degradation. In order to produce the best results in sulphide toning it is necessary to pay particular attention to the following points:—

1. Prints should be correctly exposed so that in development they reach the full depth in the usual time—"forcing" is not only useless, but sometimes causes fog.
2. The fixing must be thorough, preferably in two separate baths, and the washing must also be thorough.
3. The sulphide solution must not be used too weak.
4. Prints should not be left in the sulphide bath a moment after they reach the full tone.

5. On removal from the sulphide bath, the prints must not be allowed to stick together in the washing water.

We give below a list of the principal failures and their causes :—

a. Loss of detail in the half-tones.—This is caused by the hypo not being thoroughly removed in washing after fixing.

b. Degraded whites and local stains.—These are generally caused by "forcing" in development, by insufficient fixing, or omitting to keep the prints on the move during fixing.

c. Blue spotes.—These are usually due to particles of iron in the washing water, and can generally be prevented by tying on the water tap a bag made of swansdown, or similar material.

d. Yellowish tones.—These are caused by the prints being over-exposed and not fully developed. Also by the use of old or decomposed sulphide.

The sulphide bath should not be weak, in fact, it should be rather on the strong side, but not strong enough to cause blisters.

By dissolving four ounces of sodium sulphide in twenty ounces of hot water we have a convenient stock solution, from which a working bath can be made by taking three ounces of stock to every twenty ounces of water.

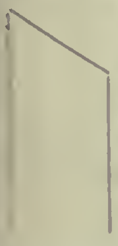
We sometimes hear of one make or grade of paper being perfect for sulphide toning, whilst another is condemned as useless, but photographers should remember that all gelatines do not possess the same degree of permeability, and therefore a hard surface paper may require a longer time in the fixing and washing.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication

Cut-out Mounts.

A VERY quick and reliable way to produce small cut-out mounts is to make a template the size of the opening required by squaring up a piece of waste cardboard on the trimmer or guillotine, of course cutting the edges exactly square and true. Then place this on the card to be cut out, and mark round the edges with a pencil.



These templates of card can be saved and used over again as often as required, and save a deal of time measuring and squaring. Of course, if a very large size opening is required it can be set out with square and straight-edge in the usual way. The best way to cut the mount is to get a half-inch bevelled edge chisel, ground away on the right-hand side until it is the shape of sketch. This provides us with a very effective mount knife, which has the great advantage that, being narrow, it is very easy to keep sharp, and can be kept thin and sharp by rubbing on a sandstone and finishing on an oilstone.

The straight-edge is best made of hard wood about three inches wide, half an inch thick, and the edge bevelled at about an angle of 45 degrees. Then, placing the straight edge on the mount up to the pencil-line and holding it firmly, it is quite easy to cut a splendid bevel by keeping the cutter flat to the edge of the bevel. The mounts cut out cleanest if cut on a piece of glass.—E. H.

Printing from Stained and Dense Negatives.

THE problem of a deeply stained negative such as formed the subject of a query recently in the "Answers to Correspondents" column occurs more frequently nowadays in the practice of those catering for the amateur than in professional practice. So does the over-dense negative when it reaches the stage of requiring undue time to print. Such cases as these, provided that the stain or the density in either case is not patchy, are easily dealt with by printing on bromide paper and exposing to diffused daylight. The exposures are very short, and indeed it is easy to over-expose. Care is needed also to ensure that light does not get through the join in the back of the printing-frame or at the edges of the negative, or black lines will result on the print. If the negative is flat as well as being dense, gaslight paper exposed by daylight will give a print of surprisingly good quality except in the case of yellow stain, through which printing on gaslight paper is practically impossible.

If a large number of prints is wanted it will pay to make a transparency by contact on a dry-plate in the same manner as printing on bromide paper. The exposure required near a window will be found to be too rapid for convenience, and it should be made well away from the source of light, in addition to extra care in the precautions mentioned. A new negative is then made from that in the usual way. This procedure is recommended in cases where a considerable over-exposure has been given inadvertently. The plate is developed well out to obtain the gradation, and, though it will be unprintable, a better negative can be made from it by reproduction than by tinkering with the developer on the original plate.—ARGONNE.

Hydroquinone Caustic Developer.

THIS is the favourite developer for line work, but certain precautions are needed in its use. Forcing nearly always results in a deep brown stain, and so sometimes does omission to rinse the plate well between developing and fixing. For regular work of good quality a fixed time of development at a certain temperature is almost a *sine qua non*, and the temperature in no case should be below 60° or over 75°. A further point is that the developer should not be used more than once. This may seem wasteful, but I have proved it to be the only reliable method of working.

It may not be generally known that this developer can be used to make a rich bromide print from a flat negative. This extra contrast is not so great as is obtained when gaslight paper is used, and the hint is therefore more likely to be of use in enlarging than in contact printing. Here again the developer can be used once only. Therefore small trial slips should be made, and then the final print well wetted and drained, so that a small quantity of developer can be used for it.—SAPPER.

A War-Time Window Sign.

A SIGN that requires very little illuminating power, while being very effective and at the same time complying with the new Lighting Order, is much easier to make than might be imagined. The principal material is a sheet of thin metal, such as zinc or tin, the size of the sign required. Any old stuff will do, or if it is not to be had, a sheet of stiff brown or "art" paper makes a very fair substitute if stretched on a rough wood frame. The required lettering is outlined with pencil, and holes are punched all along these outlines about 3-16 in. apart by means of a sharpened nail and a hammer, resting the sheet on a bit of soft board. A sheet of quite buckled metal will stiffen and straighten out during the process. To get the best effect the punch used should be the same throughout, and a straight, not tapering, stem used, so as to get the same size hole every time. That is why a nail is good, though it may buckle up before the job is finished.

When the lettering is done, white or coloured tissue paper needs to be fixed behind the sheet, brushing the paste round, but not on, the letter, or the holes will fill up. All that remains is to make the sheet the front of a box, or to frame it and drape curtains round it, according to whether it is for outside or inside use, the small light being behind, of course. On dark nights a sign made like this shows up brilliantly, and can be read at a considerable distance; and the economy in light will release a portion of the "ration" for other purposes.—CAROLUS.

[Even such a sign as the above, if displayed in a shop front or outside premises, is an infringement of the recent Lighting Order.—EDS., B.J.]

TRIBUNAL APPEALS.—At Scarborough Local Tribunal in the case of an artist photographer, forty-five, Grade I, a Russian subject, the solicitor argued that the Convention made with Russia with regard to conscripting Russian subjects in England only applied to men of eighteen to forty-two, this being the limit of conscript age in England at the time. There had been no Convention since, probably for very good reasons, and as a matter of fact the tribunal specially set up to deal with claims of Russian subjects could have no jurisdiction in that case. It was decided that the Town Clerk write to the Local Government Board asking which, if any, tribunal could deal with the case.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SATURDAY, JULY 6.

Manchester Amateur Photographic Society. Outing to Werneth Low.
Hackney Photographic Society. Outing to the Zoo.
Halifax Scientific Society. Outing to Blakehorn Valley.

TUESDAY, JULY 9.

Manchester Amateur Photographic Society. Monthly Meeting. "A Talk About Printing Processes Generally." F. G. Curson.
Hackney Photographic Society. "On Wold and Down." J. Grice.

CROYDON CAMERA CLUB.

INFORMAL sessions have their value emphasised when they manage to secure such an able exponent of artistic and unstereotyped portraiture as Mr. Angus Basil. When first run to earth by the "office boy," Mr. Basil was most emphatic in his assurances that lecturing had never been included in his walk of life in the past, or contemplated for the future. Moreover, though he had never visited the Club he had certainly heard of it, and, apparently, drew a vivid mental picture of appearing on a platform at one end of a hall packed with an audience ready to let fly with quick-firing automatics on the slightest provocation. Hardly a reassuring vision for a first appearance, but the "informal session" ticket had weight, and down he came last week with a large bundle of representative prints under his arm.

Speaking as a professional, he said that he felt (but did not look) profoundly nervous in chatting to the amateurs of Croydon. He had begun with utilitarian photography, and the more artistic side came later. He thought that the professional of the future will undoubtedly occupy a more important and better position than in the past. Many men with artistic aims, and unfettered by convention, are advancing rapidly, and being sought for in ever-increasing degree by the general public. In consequence, a large proportion of the business hitherto done by the old type of fashionable West End studios is being transferred to the newer comers. Admitting that the work of many of these studios is technically first-rate and exquisitely finished—a beautiful example of veneered cabinet work, so to speak—yet the public is being gradually taught to look for and appreciate something different, something better with higher aims. So far as lay in his power, he had endeavoured to keep ahead, and even if the more advanced work did not appeal to all of his sitters, it indicated that the less difficult "usual" could be had for the asking.

In his opinion, the portrait, in all its essential features, should be made at the moment of exposure: he disliked excessive retouching, or faking, on the negative, and especially on the print. To such an extent do some carry the last that they might well, he said, abandon the art of the camera and take to brush and paint. As regards posing, one should not strive after the extraordinary, but endeavour to realise the reality, and, except with theatrical work, which demands a more forced method of expression, the best positions are observed and not created. As a general rule, it is better to allow something wrong to pass than to destroy a pose or position characteristic of the sitter, especially as regards the poise of the head, though in some cases it is compulsory to alter an ugly attitude; here suggestion, rather than compelling hands laid on, is to be observed. The great thing is to let the sitter feel at home, and appropriate surroundings materially help in this direction. Even leaving the studio, ostensibly to change plates, may allow time for a galvanised photographic look to revert to the natural.

He favoured fairly long exposures of from three to four seconds, and even longer, and his pet slow-acting, antediluvian Vogel lens of 16 inches focus (used for cabinets and whole-plates) was fully in sympathy with this point of view. Fairly long exposures permit of averaging the expression, and frequently he had secured a nice effect by recording the demise of a smile. He believed in a well diffused light from a small source, and employed an ancient Boardman-arc with umbrella reflector, in front of which is an inclined diffuser covered with butter-muslin. For varying the degree of concentration and locally suppressing illumination, he places pieces of cardboard on the diffuser, and occasionally employs a second arc-lamp (naked) to secure special effects in lighting, but these rather abnormal studies have a tendency to destroy the likeness. He usually allows the light to fall at the orthodox angle of 45 degs., which does not limit one to stereotyped lighting, as pictures can be made from all sorts of angles relative to the sitter. It is better, he said, to have too much top-light than an excess of side-light, even if the shadows under the eyes be somewhat heavy. Personally, he rarely employs a reflector for the shadow side of the face, relying on light reflected from the walls of the studio, which is, of course, assisted by the diffusion given by the butter-muslin screen.

In the discussion the president, Mr. A. F. Catharine, said sitters are rarely good judges of their own portraits, and often relied upon the opinion of their friends. This might possibly be due to their knowledge of their own features being confined to the reversed image in mirrors. He inquired whether Mr. Basil had ever used soft-focus lenses. Mr. E. A. Salt said both Mr. Smith and he had always advocated a powerful light from a small source, and well diffused for busts and three-quarter lengths. Many studios had been fitted with several half-watt lamps spaced widely, and it had been found that though normal lighting was perfectly satisfactory, special concentrated illumination was impossible to attain, which limited the operator materially. Were the pieces of card sometimes placed on the diffuser put on round the circumference? The Rev. C. W. Le Warne said he had an old portrait lens with no slot for stops, which must rival Mr. Basil's in antiquity. He used the front lens only; it was of long focus, and gave pleasing drawing and definition. Mr. H. King (a prominent local professional) congratulated the lecturer on the wonderful work shown. Unfortunately, originality was not a paying game at Croydon. He had been much struck with the "average expression" idea, and meant to make a trial. The mean between an initial grin and a final ferocious scowl should be interesting. Did Mr. Basil work exclusively by arc-light? Mr. W. H. Smith pointed out that soft focus lenses often obliterated shadow detail, which then appeared choked. If detail and outline in the shadow were sharply defined this did not occur. He preferred nainsook instead of butter-muslin for the diffuser.

The lecturer, in reply, said the explanation offered by Mr. Catharine as to sitters being poor judges of their own likenesses very probably was correct. He invariably suggested that the choice of prints should be made at home, and not in the reception-room, knowing the opinion of friends to be of importance. He did not employ soft-focus lenses, but when making enlargements sometimes used a layer or two of tulle over the lens (it was unfortunate Mr. H. P. C. Harper was not present to bow the acknowledgments of the inventor). In reference to some remarks of Mr. Salt suggesting that professionals should adopt standards more or less regardless of the wishes of their sitters, he doubted whether this could be done. The great difficulty was to find out what they did want, and much depended on their personality. For instance, one politician eagerly seized upon one position taken because it resembled Lloyd George. In another case, in his early days, since repented, a fat Jewess in rather extravagant costume was taken. Double chins were removed, and chunks knifed out of her waist, and the negatives heavily retouched, yet she was not pleased. Still more glittering representations in due course were submitted, which again met with disapproval. Then a plain homely portrait was made, and pleased vastly. Here the personality of the sitter had been entirely misjudged. In reply to Mr. Salt's question as to the pieces of card on the reflector, he did not always place them circumferentially; one piece in the centre was often useful for toning down a bald patch on top—he felt sure Mr. Salt would appreciate this point. In reply to Mr. King, he said he first used the arc-light from necessity, and now did so from choice. It was most puzzling to change from the arc-light to daylight, because, although the luminosity values might appear to be the same, the actinic values would be found materially different. The point raised by Mr. Smith was interesting and quite true. Some artists who painted the face very broadly took care to render sharply deep shadow detail.

A most hearty vote of thanks was accorded Mr. Basil for a lecture full of practical information, much of which many a pro. would have kept to himself. Mr. Basil is not that sort, but in the unanimous opinion of the members a right good sort. As for his work, it met with nothing but eulogy.

News and Notes.

Royal Institution.—A general meeting of the members of the Royal Institution was held on July 1, Sir James Crichton-Browne, J.P., F.R.S., Treasurer, in the chair. Mr. Thomas Glover was elected a member. His Grace the Duke of Northumberland was elected President, and Sir Thomas Wrightson, Bart., was elected a Visitor. The Treasurer announced that the Managers at their meeting had appointed Sir James Dewar, F.R.S., Fullerian Professor of Chemistry.

Photographs as Legal Evidence.—Detective-story methods were employed by H. H. Cohen, attorney for the M. Salzman Company, to get new evidence to use on an application for a new trial of the negligence action brought against the company by Henry F. Sheridan, who tripped over a trapdoor in front of the company's store. Sheridan claimed that be was permanently injured, and in court he was bent forward and had the appearance of being hopelessly crippled. The defendant company maintained that his injuries were greatly exaggerated.

A jury before Justice Thompson brought in a verdict of 4,500dols. in favour of Sheridan, and this verdict was unanimously affirmed by the Appellate Division.

Subsequently Mr. Cohen and William Ramsey, a photographer, seated Sheridan in an automobile equipped with a battery of cameras. The attorney claims that Sheridan walked as erectly as was possible, and so disproved the medical testimony at the time of the trial to the effect that he was hopelessly crippled.

The three photographs taken were presented to Justice Sawyer in the Supreme Court, and he granted an order directing the plaintiff to show cause why a new trial should not be granted on the ground of newly discovered evidence.—*Rochester Democrat.*

The Practical Exposure Discs.—Our Boston contemporary, *American Photography*, kindly sends us a specimen of the exposure disc or calculator just issued by them as a portable and complete form of the monthly exposure tables, which for more than ten years past have been a feature of the publication. The calculator is a stiff celluloid disc of 3½ inches diameter, bearing two smaller, concentric discs, the inner one of which bears the figures for the time of year and day, and those for the range of subjects, the latter running from "sea and clouds" to "interiors." This inner disc is set against the scale of light-conditions which runs from "intense" to "very dull." This having been done, the middle disc is turned to bring the plate-speed number opposite the subject which is being taken, and the exposures for any stop from f/2 to f/64 are then seen on the outer rim. Our contemporary issues with the calculator a list of plate-speeds, which includes all those on the American market, among which are a number of British makes. There is only one point on which we feel inclined to say a word of criticism, and that is the instruction that the exposure should be halved when using a focal-plane shutter. It would seem that this advice is given without regard to the very great variation in the efficiency of the focal-plane shutter, which results from the ratio of the width of slit to the distance of the curtain from the plate. Apart from this, the disc may be recommended to the confidence of our American readers, who will doubtless appreciate the fact that it is arranged for use under the daylight-saving scheme, the times on the calculator being those of the clock, and thus in every case one hour later than the true time. The calculator is published at 221, Columbus Avenue, Boston, Mass., price one dollar.

War Memorial Cards.—It is a pleasure to be able to refer to the steps taken to provide photographers with a whole series of memorial cards, such as are now, unfortunately, in very considerable demand by those who have lost their relatives in warfare on land or sea. Messrs. Hood and Co., Limited, Sanbride Works, Middlesbrough, are the producers of a set of cards of most excellent design, and of a degree of variety which should be sufficient to satisfy the most divergent preferences. The cards are supplied by them with the name of the memorialised soldier or sailor printed as part of the design, so that the photographer's part of the transaction consists simply in showing the customer the book of specimens, taking down the necessary particulars, and passing on the order to Messrs. Hood. We think that the designs will receive appreciation, not merely for their artistic character, though this is of a high order, but from the fact that in almost every instance they typify action. In this respect they are in accord with the national spirit, as shown by the comparative non-observance of formal mourning for those who are gone. They are, in short, memorials of valour rather than records of grief, and we are confident that photographers who doubtless have experienced a demand for cards of this kind cannot do better than see for themselves the designs which Messrs. Hood have produced. It should be understood that the cards provide in some cases space for a portrait which, on account of the small number which is usually required, is preferably an actual photograph. Messrs. Hood will mount photographers' own prints, or will make the necessary number on receipt of the negative or print. They have other plans arranged in connection with the cards, but the simplest course which the photographer can take is to apply to them for one of the books of specimens which is supplied at the price of 3s. 6d.

Correspondence.

* *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

* *We do not undertake responsibility for the opinions expressed by our correspondents.*

CO-OPERATIVE CLOSING AT CARLISLE.

To the Editors.

Gentlemen,—You will be pleased to hear that all the photographers are closing here from August 3 until the 12th, which will give us all a much-needed rest. I sent a note round to all, and they were delighted to sign it as a guarantee of good faith.—Yours faithfully,
F. W. Tassell.

Devonshire Chambers, Carlisle, June 29, 1918.

THE USE OF THE BEE METER.

To the Editors.

Gentlemen,—I regret to find my MS. contained an error that distorted my meaning. In paragraph six of my letter six words should be deleted, and the matter read, "all stronger lights call for shorter exposure. The six o'clock light is the one light calling for pointing the meter at the sun."—Yours faithfully,
Oliver Horton.

199, Buchanan Street, Glasgow, June 28, 1918.

STEP ACTINOMETERS.

To the Editors.

Gentlemen,—Referring to your paragraph in the "British Journal" of June 21, recommending the above to be made on dry plates, may I suggest that your scale is not the most suitable, the higher densities being far too steep in gradation.

Numerical progression, rather than geometrical, I find most useful in carbon work—steps of 6, 8, 10, 12, 14, 16 minutes exposure to mercury-vapour lamp make a wedge which, after staining in permanganate gives a serviceable range. I enclose one made for use as an actinometer in carbon printing for your inspection.

Staining with permanganate is, however, not the safest proceeding, as with prolonged exposure to sunlight; the image weakens; future samples I shall, therefore, make with increased times of exposure, so as to rely on the depth of the carbon image without recourse to intensification.

I also enclose a sample in which the steps proceed from bare glass to exposures of 2, 4, 8, 12 minutes; this has two identical scales printed side by side, and is intended for use in comparing the speeds of varied makes of tissues or of different strengths of sensitising.—Yours faithfully,
A. C. Braham.

West Ealing, W.13, June 25, 1918.

[We can understand that the less abrupt steps are more suitable for tests of carbon tissue. For the comparison of development papers of different types our experience is that the steeper scale which we recommended is necessary.—Eds., B.J.]

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

F. H.—Try Messrs. Jonathan Fallowfield, 146, Charing Cross Road, London, W.C. If they cannot supply you, probably no one else can.

S. Rawson.—A number of books on these subjects are published by Messrs. Winsor and Newton, Rathbone Place, London, W. Better write to them for one of their lists.

Process.—We are very much obliged to you for particulars of your invention, but it is our custom not to publish such details until the complete specification is available from the Patent Office.

P. B. J.—The marks on the film have the appearance of deposit from hard water, and can be removed probably by rubbing the film firmly with a plug of cotton wool soaked in a fairly strong solution of citric acid.

W. Clarke.—As the agreement has now expired, it is impossible that you should be able to hold your employer by any of the terms of it. The weekly payment of salary entitles you to a full week's notice, and such notice should be given on the Saturday if this is the day of payment.

A. C.—You will have to cover up about 5 ft. at the sitters' end with dark blinds if you have no solid roof beyond the glass, then use white blinds or curtains. For groups in this form of studio, it is well to work as diagonally across the studio as possible, so as to equalise the light.

E. D. I.—Some magazines are very slow in returning photographs, and you need not assume that your prints have necessarily been accepted for use. There can be no objection in your writing a letter of reminder asking if they have been accepted or not, and enclosing stamps for their return in the latter alternative.

A. V.—The only explanation we can offer for the reversal of the negative is that by mistake the plate in question received a gross degree of over-exposure, say, by the use of a lens at full aperture instead of at a small stop. Exposure of the plate (correctly exposed) to unsafe dark-room light whilst developing is the most common cause of these reversals, but it seems impossible that such could have taken place during development in a tank. We know of nothing that can be done to put the negative right.

J. K. F.—The book you refer to is "Art Principles in Portrait Photography," by C. W. Beck, issued some years ago by Messrs. Batsford, price 12s. 6d. It is a very excellent work, but is not now obtainable. You might try a firm of second-hand booksellers, such as Messrs. Foyle, of Charing Cross Road, but it is very doubtful if you can get a copy. We sold quite a number of this book, and, possibly, a shilling or so spent on a small advertisement in our pages would bring you into touch with a photographer disposed to sell his copy.

Removing Rust.—Should be glad if you can tell us the most speedy way of removing rust from a lot of Russian iron goods, lantern bodies, etc. Is there any solution that can be painted on as a rapid means of clearing off the rust?—J. E. and Co.

There is nothing for it but to remove the rust mechanically with emery cloth, or a mixture of emery powder and oil, well rubbed on with plenty of "elbow grease." If the surfaces are flat, a good deal of labour can be saved by taking off the bulk of the rust with a broad, blunt, flat chisel.

Sophos.—This reversal is not an uncommon defect on film negatives; we have very rarely seen it on plates. Certainly it is liable to be produced by gross over-exposure, but it is scarcely possible that a whole series of exposure could have been enormously over-timed in the use of a hand-camera. A more probable cause, in fact one which we think is the most common one, is exposure of the film to an unsafe dark-room light during development. Light passes through the first developed negative and yields a positive on the underlying sensitive emulsion.

Preserving Sulphite.—I have been told that sulphite solution, which I keep by itself for adding to stock developer solutions when making up for tanks, can be made to keep better by adding something to it. Can you tell me what this should be, and if you recommend one to do this for the purpose of preventing the sulphite deteriorating?—J. B. F.

Various additions such as rectified spirit and mannite have been suggested, but their effect is very doubtful, and moreover, you can easily spend as much on the preservative as the sulphite is worth. The best recommendation we can make to you is to add to the sulphite one-eighth of its weight of potass metabisulphite. When the two have been dissolved bring the solution to the boil. This mixture is just as suitable as plain sulphite for the preservation of the developing solution, except that it may slow its action a little, and it will keep in good condition for almost any reasonable time.

Commercial & Legal Intelligence.

The first meeting of the creditors of Harry Saville Thorne, a chemist and photographer, at Selby, was held at the office of the Official Receiver, Duncombe Place, York. The proof of debts lodged amounted to £649 13s. 4d. It was resolved by a majority that no trustee be appointed. The public examination has been fixed for July 12.

The British Journal of Photography.

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Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

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SUMMARY

In a leading article we deal with two items of the present copyright law in regard to which, as our correspondence shows, there is frequently some misconception. It is not now necessary to register the copyright in a photograph in any way; copyright is created, actually and as a piece of legal property, by the taking of the photograph. In regard to the unlawful copying of a photograph by people who claim innocence, it is necessary for them, if they are to escape the payment of damages, to be able to show that they had no reasonable ground for supposing that any copyright existed in the photograph. (P. 310.)

Dr. S. E. Shepherd, in a communication from the Eastman Research Laboratory, has described experiments with the persulphate reducer showing that minute quantities of iron in the persulphate have a pronounced effect upon its action. Iron content of .16 per cent. rendered the reducer very active, whilst one of .01 per cent. caused it to be most inactive. (P. 314.)

A very full description of a new and simple method of colouring photographs in oil, using a medium largely composed of wax, with full formulæ, is given on page 311.

Attention is directed to a paragraph referring to photographers and the Royal Air Force, which appears on page 320.

A summary of the new regulation as to the amount of coal, gas, and electric current which came into force at the beginning of the present month is given on page 315. It should be particularly noted that two scales applicable to different districts are given.

There would seem to be good reason for suggesting that in the design of many photographic appliances provision should be made for the use of the foot as well as of the hand. This has been a feature of some few types of appliance, but it is one which might well be extended. (P. 309.)

An exhaustive article, with several illustrations, on the improvisation of acetylene generators from waste tins occupies "Assistants' Notes," on page 310.

A suggestion as to the economical incineration of waste prints and papers containing silver salt with a view to recovering the metallic contents will be found on page 309.

Strip-printing, lens-grinding, and glazing postcards are dealt with in "Answers to Correspondents." (P. 320.)

Mr. Alfred S. Cory returns to the subject of illustrations in American photographic journals in correspondence on page 319.

A report of proceedings before the Exeter Local Tribunal in the matter of a photographic conscientious objector will be found on page 319.

EX CATHEDRA.

Silver from Waste Prints. While the photographer in a large way of business makes it a rule to recover the silver from spent fixing baths, the old practice of incinerating waste prints has largely gone out of use, one reason for its abandonment being the very much smaller proportion of silver contained in waste prints or waste sensitive paper of the bromide or gaslight kind as compared with the albumen paper of the old days. However, the smaller proportion of recoverable material in many cases may be counterbalanced by the very much larger gross quantity of paper which may be treated in the shape of trimmings and clippings, waste prints, or paper, provided that the means for its recovery are correspondingly efficient. In this connection a suggestion may be made that a convenient appliance for day-by-day reduction of waste paper, etc., to ash may be found in one or other of the gas-heated incinerators which have been introduced during the last year or two for the handy and hygienic destruction of kitchen refuse. Messrs. Fletcher Russell, of Warrington, are the makers of one pattern, and we think at least two other manufacturers of gas appliances have models upon similar lines. The first cost of an incinerator of this kind is a pound or two, but it is an appliance which consumes an almost negligible amount of gas, and can deal continuously with waste paper or prints, wet or dry, and without the need of the careful manipulation for prevention of loss of ash, which is necessary if the photographer fits up some improvised combustion chamber after having been to the trouble of accumulating a considerable bulk of the waste paper material.

* * *

Foot-Power. In the plans which may be presumed to be in process of development by those responsible to manufacturers for the design of photographers' appliances, it may be hoped that consideration may be given to the use of the foot as well as the hand as a motive power in photographic operations. It will occur to many professional photographers that an appliance which leaves the hands free for other purposes has a good deal to recommend it on the score of rapid action, yet hitherto this feature has been but little in evidence among the mechanical devices, of which every year more and more use is made in studio workrooms. Mr. Hana, if our memory serves us correctly, led the way in this direction in providing a foot-treadle for his rapid bromide printing machine, but other designers seem to have looked askance at this method. There is a pattern of a foot-power dry-mounting press on the market, yet no other instance of the same principle occurs to us as we write. One reason for the neglect of what is an obviously contributory means to economy of labour is perhaps that many appliances are supplied with a view to their finding a market among amateur as well as among professional photographers, and the semi-permanent nature of any appliance which is operated by the foot is quite enough to put it outside the choice of the amateur worker. Nevertheless, there are many operations, such as strip-printing, squeegeeing, trimming, bevelling, not to say the rocking of developing and other dishes, to which foot-power might be applied with advantage, and where it would at one and the same time make the work lighter and increase the output. With a single aim at the needs of the commercial and quantity producer of photographs there is no reason why this feature should not appear in the commonly-used appliances much more than it has.

* * *

Sizing Prints. We are glad to see that Mr. Davis's article on colouring photographs has been appreciated by our readers, and we have pleasure in adding a hint or two from an old colourist, which should also prove of service. The surfaces of photographs differ very much in their capacity for receiving colour, and many are improved by some method of sizing or preparation. Bromides as a rule require little in this way, either for oil or water-colours, but if the surface has been disturbed by scraping or if there are any breaks in the paper it is necessary to give some protective coating to keep oil colours from soaking in. The simplest way of doing this is to brush on a thin coating of ordinary starch as used for mounting. This may be done after mounting; or a thin solution of gelatine may be flowed over, it being difficult to avoid brush-marks if a sufficiently hard gelatine be used. Collodion prints are also rendered much easier to colour with water-colours if they are dipped in a weak solution of hard gelatine, such as Swinburne's patent isinglass, before mounting. A similar treatment is also recommended for platino prints, as it removes its absorbent character, which renders it impossible to spread even washes or remove or correct faulty touches. If platinum prints are to be coloured in oil, the print should first be immersed in the gelatine solution and then allowed to dry, and floated a second time on the face so as to get an impermeable coating.

* * *

Avoiding Waste. If any one were to circularise photographers, and offer to show them how to recover their income-tax payments, most would regard it as a swindle, and few would be willing to pay a good price for the secret. While we will not go so far as to say that this would be possible in all photographic businesses, we are certain from our own knowledge that in many studios a sum equal to the amount claimed by the Government could be saved every year by strict attention to the use of plates, paper, and other material. In a "one man" business waste is probably reduced to a minimum, but directly assistants are employed some check upon consumption is necessary. For example, a periodical comparison of the number of plates purchased with the negatives produced will often prove rather surprising, while, of course, the same may be said of printing-paper and to a lesser extent of chemicals. Many workers have formed the very wasteful habit of firing off plates in profusion and then selecting one-third or less of the resulting negatives for proofing. This may appear incredible, but has occurred in several cases within our own experience. In the printing-room much waste may occur through inattention. A salutary check is put upon it if it is known that at the end of the month an explanation of the shortage of stock will be required. Similarly with chemicals: the assistant who guesses quantities very seldom errs on the side of parsimony, twenty or thirty per cent. in excess of the proper quantity being often used. About the only thing photographers are niggardly with is hypo, but that used to be because of the trouble of cleaning out big dishes and tanks; now it is probably on account of the price.

TWO POINTS IN COPYRIGHT—CREATION AND THE "INNOCENT" INFRINGER.

Although it is six years since the present Copyright Act, that of 1911, came into force, it is constantly our experience that many photographers are still unfamiliar with the changes which it introduced, despite the fact that almost immediately after the Act took effect our publishers issued a shilling manual, "Photographic Copyright," in which all the new provisions are specifically explained. In parenthesis, we may be allowed to say that this small text-book is one of those manuals which at one time or another is pretty sure of saving its purchaser very many times its cost. Unfortunately, photographers who have any concern with the sale of reproduction rights, or with the infringement of their rights by others, too often take a step which is a blunder, and then, when they find that they require to know something about the subject, turn to a manual such as this—not infrequently at a stage when it is difficult to repair the mistake. Glancing back over questions which have recently been addressed to us, we find that two of the most common concern the "making" of copyright in the first instance—and the conditions which apply in the case of infringment where the infringers claim, as they can under the present Act, exemption from damages on the ground of innocence. It may, therefore, be of service to many if we briefly refer to these two specific matters.

The most usual example of ignorance of the present copyright law is contained in letters which say: "Will you kindly make the enclosed photograph copyright for me, and let me know the fee for so doing?" Evidently the writers of requests such as this are under the impression that it is still necessary, as it was under the previous Act, to register the copyright in photographs at Stationers' Hall. But this formality has been swept away by the 1911 Act, a reform which is greatly to the advantage of the photographer. For one of the provisions of the previous Act was that "no proprietor of copyright shall be entitled to the benefit of this Act until such registration, and no action shall be sustainable nor any penalty recoverable in respect of anything done before registration." Under the old Act that meant that unless a photographer happened to have registered his copyright in a particular photograph, he could obtain no redress if his work was pirated. Apart from the removal of this formality, the two Acts embody the same principle of investing the author of a photograph with the copyright in it, except in the case when the photograph is ordered and is to be paid for by some other person. But the present Act, in the absence of any formality, broadly declares that copyright "shall subsist," and qualifies that declaration differently according as the work which is to be copyright is published or unpublished. Photographs, being in most cases unpublished at the time of their making, the condition which requires to be fulfilled in order that copyright shall subsist is simply that at the date of the making of the work the author is a British subject, or resident within such part of the King's dominions to which the Act applies. In other words, it is now not necessary to do anything at all in order to create the copyright, actually and legally, in a photograph. The copyright is created automatically by the creation of the photograph. To whom it shall belong is another matter, and one which, it would seem, is pretty well understood by photographers, who now realise that the copyright in a photograph belongs to them when it is taken "on their own," and not to the order of someone else and for payment in some form or other. Some of our correspondents to whom this reform by the 1911 Act has been explained have expressed a feeling of some degree of insecurity. Apparently they imagine that the registration at Stationers' Hall was some kind of guarantee of the existence of copyright. It was, of course, nothing of the kind, but simply a necessity imposed by the previous Act, and one which was condemned by a committee of the House of Commons as "anomalous, uncertain, and productive of great disadvantage and annoyance to authors, with little or no advantage to the public." As a matter of fact anybody could take a photograph, the copyright in which belonged to somebody else, and register it at Stationers' Hall as their copyright. Registration was made without any investigation, and if subsequent proceedings necessitated an inquiry into the real ownership of the copyright in a photograph, the mere fact of registration at Stationers' Hall was entirely without weight in the matter. Registration, as we have explained, was, under the old Act, made a condition of legal action taken to recover any damages in respect to infringement, but, so far as concerns the proof of a photographer's ownership of copyright, or its denial by a defendant, there is not the slightest difference between the previous Act and the present one.

The second matter in regard to which questions are very often addressed to us is the liability or non-liability of persons who unlawfully copy or reproduce a photograph. This is a point which affects photographers in two different ways. A photographer may be the injured party through his work being copied by others, or, on the other hand, he may be the guilty party, through carrying out a customer's instruction to copy some photograph which neither he nor his customer is entitled to copy. In the one case the photographer naturally, and in his own interest, requires to know in what circumstances anyone copying a piece of his work can escape the consequences by pleading innocence; and the same thing applies to him, himself, in cases where he is carrying out a customer's order. Now in this matter of "innocent infringement" the present Act is somewhat different from its predecessor. Under the old Act the innocent and the wilful infringer were held equally liable. Under the present Act a very minor measure of escape is provided for those persons who may decide to claim exemption from the consequences of unlawful copying on the plea of innocence. The narrowness of the path by which the alleged innocent infringer can escape is thus a protection to the photographer whose work is copied, but at the same time a warning that the same thing applies to him where, in accordance with a customer's instructions, he, himself, may be the infringer. On both accounts it is, therefore, well that the precise terms on which an infringer can claim to have acted innocently should be understood. These are the subject of Section 8 of the Copyright Act ,which says:—

> Where proceedings are taken in respect to the infringement of the copyright in any work, and the defendant, in his defence, alleges that *he was not aware of the existence of the copyright in the work*, the plaintiff shall not be entitled to any remedy other than an injunction or interdict in respect of the infringement if the defendant proves that at the date of the infringement *he was not aware and had no reasonable ground for suspecting that copyright subsisted in the work*.

Note the passages in this section which are italicised. The ground on which the plea of innocence may be put forward is that, according to the infringer's judgment, there was no copyright whatever in the work. It is rather curious that in the first case or two which turned on this point, it was pleaded on behalf of the infringer that he thought the copyright belonged to someone else than the real owner, namely, to the person from whom he received the print. But it is perfectly clear from the text of the Act above quoted that such a plea is entirely off the mark. If an infringer wants to plead innocence, the only ground on which he can do so is by showing that there appeared no sufficient reason for suspecting that copyright subsisted in the work; and it is very difficult to imagine what are the kinds of photograph in respect to which such a suspicion could be held for an instant. By virtue of the wide scope of the Act, copyright subsists in every photograph which is taken. It may belong to the photographer or to somebody else, but it must exist as the property of somebody, for, according to our reading of it, there is nothing in the Act which supports the belief that the copyright in the photograph can be destroyed except by lapse of time—a time which, in the case of photographs, is fifty years from the making of the negative. It will, therefore, be clear, from what we have said, that the plea of "I was acting innocently" has an extremely limited application where a photograph has been unlawfully reproduced, and photographers who may meet with it in disputes connected with the reproduction of their work need not hesitate to pooh-pooh the suggestion. In fact, it is only necessary to refer those who put it forward to Section 8 of the Act in order to compel them to admit that it is not any defence of any infringement which has been committed.

A WAX MEDIUM AND PROCESS FOR THE PERMANENT COLOURING OF PHOTOGRAPHS.

"If, in any work to be executed in azure and best sinopis, he shall be found by the dean and the jury to have cheated with the materials, the delinquent shall incur a penalty of 10 livres parisis."—Dalbon's Origines de la Peinture à l'huile.

Much time, thought, and search was given in the nineteenth century to discover the secret of the great old masters why their colours retained sweetness and purity of colour, and what was their perfect technical method which preserved their work for nearly four centuries. When in olden times such a clause as the above was part of the artist's contract, and when they had to prepare and grind their own colours, therefore using them carefully and sparingly, their secret is obvious. The result was also to a great extent brought about by the severe regulations framed by associations, guilds, and bodies of master painters, and it would be a good thing if guilds were in existence to-day, because, with large firms and big banks amalgamating, it is not difficult to prophesy that they will have to be re-established in order that craftsmen and trade workers may live.

Artists have now a far better selection of permanent colours than the old masters, but they still have to find a perfect vehicle that is easy to work with, without chemical action upon colours, possessing protective qualities, and, above all, permanent. Painting struggles with difficulties; all sorts of agglutinants have been tried to help to produce opacity, transparence, dryness, and the appearance of moisture with contradictory obstacles. The importance of the vehicle is manifest in many ways; it means a different process, with its advantages and disadvantages, according to the agglutinant used, their proportions, their action on coloured powders, and is the all-important question to those engaged in colouring photographs.

Wax, which seems to answer nearly all our exact requirements, is well known, but in little use, the reason being apparently that it requires special treatment to make it amenable to artistic use. In order to understand its virtues we must compare it with linseed oil and varnish, the two most important binding vehicles in use. The distinguished French painter and chemist Vibert did not believe in the use of linseed oil, but used a resin varnish reduced with benzine. Gersaint, who knew Watteau personally, deplores his abuse of oil, and adds: "It must be admitted that some of his pictures are perishing in consequence day by day; that they have changed colour completely, or have become very dirty, and that nothing can be done to mend matters; but, on the other hand, those which are free from this defect are admirable, and will always hold their own in the finest collections." In "Picture Making" C. J. Holmes says: "The oils used in painting, however carefully they may be clarified and refined, tend with the lapse of years to rise to the surface of a painting and form a semi-resinous coating of brown or yellow, which certainly darkens their tone and destroys their freshness. The painter is thus compelled to get rid of every superfluous atom of oil in his picture if he wishes it to retain its pristine brightness." One can say, without exaggeration, that many pictures have been spoilt by a bad quality resinous varnish, badly applied. Varnish has destroyed hundreds of engravings, mezzotints, and the like, which it ought to have protected, instead of which it deteriorates to such an extent that it becomes darker than tar, proves worse than useless, and is responsible for 75 per cent. of the cracks, apart from some varieties being subject to bloom. You have to rely upon a firm's reputation, and if you should find a great change in the varnish after a year or so, the manufacturers kindly inform you they give no guarantee. Now, if we can make our own vehicle we shall be somewhat in the position of the old masters, knowing what we are using, and meeting the question of permanence more than half-way. Volumes have been written on the subject of oil and varnish, but enough is said here to prove that transparent oil is not permanent, especially on paper, which is the point that matters to photographic artists.

Virgin wax is free from the faults just mentioned, and is the material the ancients believed in, so much so that clothes were dipped in it to wrap round their dead. Ancient writers speak of the use of wax for painting, but not of their methods, so their technique is unknown to us. Excellent examples of the use of melted wax as a binding material for pigments may be seen in the National Gallery and at South Kensington. They are encaustic portraits, executed probably 2,000 years ago, and were discovered by Mr. W. M. Flinders Petrie in the Hawara Cemetery, Fayum, Egypt. All great artists have been interested in the question, and yet very few experiments have been made as to the utilisation of exotic and vegetable waxes in the process of painting. The Hon. J. Collier, in his book, "The Art of Portrait Painting," writing of Sir Joshua Reynolds' technique, says: "Later he seems to have adopted Venice turpentine and wax almost exclusively as a medium for the heads, whilst the draperies were painted with wax without the turpentine, thus getting a richer impasto."

Raffaëlli, in 1903, created some sensation in art circles by inventing his "pencils of paint," after the manner of pastel, ready for use. His discovery is a derivation from encaustic, and the sticks seem to be composed of a similar mixture. His success would have been more lasting if he had introduced a cerate paste or medium.

The following wax medium was put forward the end of last year:—

To make the medium:—

White wax (bleached beeswax)	1 oz.
Carbon tetrachloride	1 oz.
Turpentine	1 oz
Benzine (refined naphtha)	1 oz.
Ammonia .880	1 dr.

Melt the wax in a jar standing in a saucepan one-third full of water, and then add the carbon tetrachloride, remove from heat, and add, drop by drop, the ammonia, stirring all the while. When it has done frothing, add the 1 oz. turpentine, heat up again for a moment, remove from heat, and, when cooler, add the benzine and stir well for a minute or so.

For safety's sake, use a larger vessel than necessary to hold the quantity required—say, 1 lb. jar for 4 oz.

The object of the carbon tetrachloride was to make the mixture in the heat less likely to catch fire; also to assist a small quantity of ammonia to saponify the wax, because an excess of ammonia discolours the wax to a golden brown. Wax will not amalgamate with oil; the adhesion of the various coats of colour is not perfect, but when saponified it is so. Carbonate of potash will saponify wax, with water to start the action, but water also makes this reagent faulty. Water evaporates out, leaving small pinholes in the film of varnish, and is therefore objectionable, and if carried over water-colours it is liable to disturb the painting.

An improved method of making the wax medium is:—

White wax (Cera Alba)	¼ oz.
Spike oil of lavender	½ oz.
Hard primrose soap	1 dr.
Gum elemi	2 dr.
Turpentine	3½ oz.

Gum elemi is for hardening the mixture, and should be dissolved in ½ oz. turpentine and strained to get rid of the grit and dirt.

Place the soap on a plate and, with a table-knife, knead it with oil of lavender until you get a jelly, gradually adding about 1½ oz. of turpentine. Next melt the wax in a small jar, add 1 oz. turpentine; when cooler—say, 70° F.—add the gum elemi and the turpentine jelly, stirring well for a minute or so. Store in a glass jar with boxwood cork stopper as most convenient.

From the jar of medium take a small quantity and mix it with a little powder colour, or oil colour, to the required depth of tint with a palette knife on the palette (a china one is best). Then, with a soft piece of rag over the tip of the index finger, rub the tint over the enlargement or picture to be coloured. If the tint is too dark, use more medium; if too light, add more colour, spreading well over the part to be coloured. It is important that the colour, when laid on, should be of the right consistency—i.e., it should have the right proportion of colour, medium, and oil of turpentine. The smaller the surface to be painted the drier should be the paste, but too dry a colour forms a granular appearance or layer on the photograph. Suppose you wish to colour an admiral's coat, tint the medium with Antwerp blue, rub evenly all over, and then, with medium, or the rag moistened in turps, wipe off clean the buttons and gold braid parts and tint with chrome yellow or gold colour to your liking. Similarly, the face, eyes, and lips are easily wiped clean for the final touches with brushes or stumps.

Before you begin, remove all black spots caused by pinholes in the copy negative and other dark markings likely to be detrimental in the usual way; next tint all the big masses first and smaller next, and then, with lead pencil, touch out white spots. Large spots need touching up with colour and brush. For the eyes (small work, lines, and markings) use a brush of suitable size. If the photograph is a good one, the process is a simple matter, but if showing enlarged retouchings, etc., waterpoof spotting is best, as recently explained in the "B.J.," and should be done first.

The advantage of using powder colour is that it dries more quickly; oil retards the drying. Palette and brushes are easily cleaned with turps, benzine, or petroleum spirit. Do not use more medium than is necessary to get the desired result. If the face is delicately modelled, use a transparent flesh colour, and if the shadows are too dark use an opaque mixture. If powder colours are not to hand, take oil colours; if they are of poor quality or contain an excess of oil, spread on blotting paper or a slab of plaster of paris to absorb the oil, then transfer it to china palette. The deep shades of pastel, being nearly pure powder, can be made into a coloured paste with the medium and used.

The process presents the following advantages:—

1. It is easy to colour large surfaces easily and uniformly.
2. The colour can be entirely removed by turpentine without affecting the photograph if the colouring is not to your liking.
3. The colours dry fairly quickly, yet time is given for the passage in hand.
4. The medium will carry a tint over dry water-colour without moving the underlay.
5. The texture of the photographic image is left unchanged.
6. It possesses the power of adhesion to the surface of photographic paper to a superior degree than water-colour.
7. It has remarkable spreading qualities; is easy and pleasant to work with.
8. The paint is more pliable, therefore eminently suitable for work on paper.
9. Does not pucker up like oil; does not crack or fissure; no retouching medium required or the need for "oiling out" as with oil painting.
10. No preparation required before beginning work.
11. Unaffected by acids and has protective qualities.

As may be expected, the process is equally effective for B. and W. finishing, and when one thinks that in many cases a mere transparent film is required to take off the death-like look in enlargements, that the work is done more quickly than it can be described, and that no visible trace is left of the means employed, it should prove most useful.

Those who have had any experience at all in finishing work know that the grain of the paper is a great factor. Matt papers with a fine grain are preferable to smooth ivory surface or glossy variety. Except glossy P.O.P. for dye-work, all glossy paper should be avoided, but if one is obliged to colour on glossy with the medium, colour all over as described, set aside until next day to harden, and then polish with a clean brush as used for cleaning silver; or warm the work in front of the fire or by means of a stove until the wax comes to the surface of the colour work and leaves a gloss.

Although wax and turpentine are used in this process it is not what is called encaustic, which is wax and colour heated by means of metal palettes, a moderately hot iron being used to fuse the tints and make the result less flat in tone.

If you have a dark subject, e.g., black dress against dark brown background, the picture can be varnished to give depth, the same as Raffaëlli colours can be varnished.

Some may say, why bother about another process when we have water-colour which many find more permanent than oil-colour? But portraiture in water-colours presents almost insurmountable obstacles if the demand is for a medium-sized head, carefully finished, with some pretence of flesh tone and a realistic likeness. From Rembrandt, who used washes of sepia, to our own Sargent, who has to-day a full palette at his disposal, and has produced masterly landscapes in the medium, the water-colour portrait is missing, proving the process unsuitable. Therefore, the masterpiece for students to study is likely to remain practically unknown; this condition of affairs is largely contributed by the difficulty of using Chinese white.

Pastel is a coloured dust laid dry on to a surface to which it scarcely adheres, and, when fixed, looks like distemper, and makes very little headway in the arts. Oil painting alone survives, but even that hardly fulfils the most modern requirements. First, in order to apply the colour to paper or canvas with a brush, it is necessary to add ten times more oil than is requisite, and all the mischief comes from the excess of oil. Varnish, unless skilfully used, is apt to make an enlargement look cheap and "Whitechapelly"; a dead matt finish looks superior, and has been proved by experts to reflect more coloured light than a varnished surface. It often happens to the finishing artist to have a print over-exposed; the background and clothes, when coloured in water-colour, appear passable, but the flesh is a tone too dark. Oil colours are objected to as shiny, though wanted for covering power. If, however, a wax medium is used to give a dead matt effect, the result is in keeping with the rest of the picture. Paint quality, which learners find difficult to acquire, is due to the peculiarity of oil and varnish; with cerato pasto a quality is easy got, either a luminous transparent film of colour, pearly translucent tints, or opaque colour, without any messy appearance.

Many photographers have ability for colouring, merely requiring an easy means of applying colours, and as it is like making a scientific analysis to describe some tints accurately, they are in a position to do good work by knowing their patrons and getting first-hand information—so much preferable to sending away their work to experts, who may or may not have the power of colour clairvoyance.

Coloured photography is nearly as old as the process itself. War memorials have increased the demand, and, judging by books on colour published in America, colour over there is much to the front, and is likely to be more in evidence here. In reality, the likeness and the sentiment of a picture is emphasised as definitely by the colours as by its design.

Much will yet be done in colour plates and colour-recording papers, but it is doubtful if they will give simultaneous contrasts to which the eye is subject, and we are not told the amount of time required to get results or how plates are to be modified for colour; therefore it will be well to proceed on the lines indicated.

The claim put forward here is merely a newer, simpler, and more perfect vehicle for work on photographic paper, by which each worker in the field may more easily strive to hold his own in the peaceful struggle to achieve things of beauty.

A. VERNON GODBOLD.

PHOTOGRAPHS AT THE NAVAL EXHIBITION.—The remarkable photographs prepared for the Ministry of Information's great Naval Exhibition are now on view at the Princes' Galleries, Piccadilly. The pictures number nearly 200 and range from 21 ft. by 13 ft. 3 in. to 12 in. by 9 in. The photograph, which shows the old Vindictive after her return from Zeebrugge, had to be carried into the gallery in four pieces. The smallest photographs show the shrapnel-holed cap and binoculars of Captain Carpenter, the heroic commander of Vindictive.

A photograph of special interest is of a hospital ship sinking after being hit. Like the Llandovery Castle, she was a Union Castle liner. Other striking photographs show the convoy system at work.

THE EFFECT OF THE IRON CONTENT OF AMMONIUM PERSULPHATE ON ITS PHOTOGRAPHIC REDUCING POWER.

(Communication No. 60 from the Research Laboratory of the Eastman Kodak Company.)

It is well known that different commercial preparations of ammonium persulphate show wide variations in their behaviour in attacking the density of photographic negatives. The typical peculiarity of persulphate, namely, its selective action on the higher densities, has received many explanations. In this direction the most important contributions to the chemical mechanism of persulphate reduction are the following:—

H. Marshall (*Trans. Edin. Phot. Soc.*, 1900, 23, 168) showed that the action of persulphate on metallic silver is what is termed auto-catalytic, *i.e.*, it is accelerated by the reaction-product, the dissolved silver sulphate. A chemical explanation of this is the formation of an intermediate *silver persulphate*, which is a stronger oxidiser than the ammonium or potassium persulphate; the action in question may be considered to take place in stages represented by the following chemical equations:—

1. $2\ Ag + (NH_4)_2S_2O_8 = Ag_2SO_4 + (NH_4)_2SO_4$. Very slow.

This reaction, the formation of silver ions by the direct attack of persulphate on metallic silver, is very slow.

2. $Ag_2SO_4 + (NH_4)_2S_2O_8 = Ag_2S_2O_8 + (NH_4)SO_4$. Very rapid.

This reaction, a purely ionic interchange, is very rapid.

3. $2\ Ag + Ag_2S_2O_8 = 2\ Ag_2SO_4$. Rapid.

Finally, the attack of silver persulphate upon metallic silver is also a rapid reaction.

In the absence of silver ions (or other catalyst) the reaction is slow at first, then becomes rapidly accelerated.

By adding silver ions, *e.g.*, silver nitrate or, better, silver sulphate, to a sluggish persulphate solution, the initial retardation is overcome.

It was suggested that this auto-catalytic action of the dissolved silver afforded an explanation of the super-proportional action. This, however, is not the case. Unless other factors intervene, the rate of reaction would still be proportional to the density, so that the undoubted acceleration by dissolved silver is not a complete explanation.

Different observers had noted that the water used in making up a persulphate solution affected the action. This was taken up by E. Stenger and H. Heller (*Zeit. Wissent. Phot.* 9, 73, 1910). They found that, depending upon the amount of chlorides in tap-water, the type of reduction changes from the super-proportional to the subtractive. They attribute this chloride poisoning to the formation of relatively insoluble silver chloride, which lowers the concentration of the catalytic silver ions and protects the silver grain from further attack.

It can, however, be shown that even with distilled water free from chlorides, the anomaly persists. Schuller (*Phot. Rundsch*, 1912, p. 236) brought forward more definitely a suggestion often tentatively advanced, namely, differential diffusion. Schuller adopts the silver persulphate or catalytic theory, but considers that super-proportional action on the higher densities is much less determined by poisoning in the lower densities than by a restriction on diffusion in the higher densities.

As against these explanations, Luppo-Cramer (*Colloid Chem. und Photographie)* advanced a colloid chemical theory. He considers that the composition of the developed and fixed negative image is not pure metallic silver, but remains an absorption compound of silver and photo-halide. The amount of photo-halide and *a fortiori*, of normal silver halide, is very small, but it is supposed to be greater in proportion as the exposure is less. There is then more photo-halide in the lower densities than the higher. This, he suggests, is due to a more energetic attack of the developer on the grains of the higher, more exposed densities.

Luppo-Cramer regards this as an explanation of the peculiarities of photographic reducers. Reducers with a silver halide solvent present in solution with the oxidising agents—as in Farmer's reducer—will attack the lower densities more strongly than the upper, and we get subtractive action. On the other hand, in reducers like persulphate, or in chromic acid poisoned with soluble chloride, the lower densities having more halide are better protected from attack.

It is to be noted that the facts and explanations brought forward still fail to account for certain minor characteristics of persulphate reducers. One of these is the already mentioned variation, particularly of initial activity, between different preparations having the same persulphate content. Another is the action of acid and alkali on this initial activity.

Luppo-Cramer, in support of his photo-halide theory, instanced the equalising action of sulphocyanide (a silver halide solvent) upon ammonium persulphate. This combination was first recommended by Bayley and Puddy (*Phot. News*, 1900, p. 174) as giving a proportionate action.

In the course of some experiments intended to test Luppo-Cramer's views on the negative image, Bayley and Puddy's combination was tried. It cannot be said that it is very satisfactory either chemically or photographically. In the first place, like other complex cyanides, sulphocyanide is attacked by persulphate with the liberation of hydrocyanic acid. In the second, measurements with sensitometer strips show that there is no certainty of proportionate action.

In trying the combination with different persulphate preparations it was observed that they all reacted, more or less vigorously, for *iron*. Further, it was noted that the preparation showing the least initial activity, or the greatest initial sluggishness, gave the weakest reaction for iron, while the most vigorous preparation, one, in fact, very difficult to control, gave the strongest reaction.

The preparations were therefore analysed for iron, with the results given later.

On adding ferric sulphate to the solution weakest in iron till it was approximately equal in this respect to the strongest, the initial activities were made practically equal. Quantities of iron in excess of this relatively small amount gave reducers of uncontrollable character, the action becoming very irregular and localised.

The small variable amount of iron salt present as an impurity in ammonium persulphate is thus the cause of its variability, and iron, however introduced, is a powerful catalyser of the action of persulphate on metallic silver. The chemical reactions involved show that we have here a case where a side-reaction supplies more rapidly the auto-catalyst for the main reaction, while the main reagent re-energises the side reagent or catalyst. Iron, as a ferric salt, *e.g.*, ferric sulphate, rapidly attacks metallic silver forming silver sulphate and ferrous sulphate:—

4. $Fe_2(SO_4)_3 + 2\ Ag = Ag_2SO_4 + 2\ FeSO_4$,

and the *ferrous sulphate* is rapidly reoxidised to *ferric* by persulphate.

5. $2\,FeSO_4 - (NH_4)_2S_2O_8 + Fe_2(SO_4)_3 + (NH_4)_2SO_4$,

so that the concentration of ferric iron tends to be kept up to the initial level. Further, the silver salt (or silver ions) supplied by reaction (4) gives the necessary acceleration to the persulphate reaction proper, these reactions being those already noted in equations 1, 2, and 3.

The function of the iron then is somewhat like that of a pilot flame. By immediately furnishing silver ions, through reaction (4), it abbreviates the initial retardation and gets the rapid following reactions in full swing without delay. At the same time, the catalytic action of iron explains in part the effect of acidity and alkalinity on the persulphate reducer. So long as an acid reaction obtains, the iron will be in the active ionised condition. If the reacton becomes alkaline, the iron will be progressively removed by hydrolysis, being converted to ferric hydroxide, which, moreover, is strongly absorbed by gelatine, with a tanning effect and probable reduction in diffusion velocity.

It is necessary to note at this point that this iron catalysis does not stand in any contradiction to the other aspects of persulphate reduction. In particular, experiments with iron-catalysed persulphate strongly support the theory that it is a superposition of diffusion conditions upon auto-catalysis which leads to the characteristic persulphate effect. This superposition of diffusion or coupling of diffusion with a chemical reaction in the photographic layer has been frequently noticed, and we can generalise the present result as follows:—

1. If in a photographic process the reaction products affect (accelerate or retard) the primary action, then the speed of this will depend upon their rate of removal and momentary concentration.

2. These products, if soluble, will tend to diffuse away most rapidly in the direction of regions of lower concentration.

3. From the known structure and distribution of the negative image, diffusion, and hence exhaustion, of reaction products will occur more easily in the lower densities than in the higher. Conversely, there will tend to be a superproportional accumulation of the reaction product in the more strongly exposed regions, the lower layers next to the support eventually acting as reservoirs.

Amounts of Iron.

The percentage quantity of iron involved is not of a very large order, as will be seen by the following data:—

Sample.	Make.	Persulphate	Iron per gram Persulphate.	Remarks.
No. 1	Commercial	98·3%	·0006 gram	Could just be used in 5% solution. Quite active at once.
No. 2	Commercial (same firm different stock)	97·8%	·00162 ..	Could not be used in stronger than 2% solution. Very active at once.
No. 3	Laboratory product	98·2%	·000088 ..	Very inactive; in 5% solution hardly any action in 15 min. Iron alum or silver nitrate brought it up to No. 2.

In a later communication data on the relation of the iron concentration to the action measured sensitometrically will be given. Meanwhile it may be noted that in a 5 per cent. solution persulphate the amount of iron required perceptibly to affect the initial activity in dissolving silver is of the order of 1 part in 1,000,000.

The tolerance or upper limit of iron permissible appears to be of the order of that found in Preparation (2), 1 to 2 parts per 1,000 of solid persulphate.

My thanks are due to Mr. W. H. Davis for assistance in the experimental work.

S. E. Sheppard, D.Sc.

ECONOMY IN COAL, GAS AND ELECTRIC CURRENT.

The Order of March last to the effect that the consumpion of gas and electric current should be restricted to five-sixths of that in the corresponding quarter of the previous year has now been cancelled, and the question of economy in fuel and light is the subject of a comprehensive Order, entitled "The Household Fuel and Lighting Order, 1918," which came into effect on July 1. It deals with coal, coke, gas, and electric current, and its comprehensiveness may be judged from the fact that the Order runs to 130 sections, occupying seventeen pages of the "London Gazette" of July 2, in which it is published. Broadly, the basis of the Order is the provision of means for using gas or electric current in place of coal as a source of heat, and *vice versâ*. It also provides a separate limited allowance of gas and electric current (also interchangeable) for the purpose of lighting.

The Order extends to all dwelling houses, and it is evident that it applies to places of business such as photographic studios, for it is distinctly stated that it extends to any premises for industrial purposes where the total quantity of fuel consumed in any year does not exceed a hundred tons. In these circumstances it is of importance that photographers, in common with other members of the community, should make themselves acquainted with the terms of the Order, and, therefore, we give below the substance of these latter with the intimation that any obscure points require to be the subject of application to the Local Food Controllers who are being appointed throughout the country, and presumably in most cases are to be found in the offices of a borough council or urban district council.

The allowance of fuel is rated according to the number of rooms in premises. By "fuel" is meant coal, anthracite coal, coke, briquettes, gas, and electric current. Anthracite counts weight for weight as ordinary coal. Three tons of coke count as two tons of coal. Briquettes, not sold by weight and not exceeding 2½ lbs. each in weight, count as 1,000 to the ton of coal. Gas is reckoned as 15,000 cubic feet equivalent to one ton of coal. Electric current is reckoned as 800 Board of Trade units per ton of coal.

These "fuels" are interchangeable on the above terms, except that not less than 2 tons 10 cwt. of the allowance must be taken as coal unless with the permission of the local fuel overseer. Also any quantity of fuel allowed additional to 20 tons may be required to be taken either wholly or partly as coke.

The following are the weights of "fuel" allowed according to the number of rooms occupied in premises:—

Where the number of rooms occupied is not more than	The fuel allowance for the year shall not exceed— A			B	
	Tons.	Cwts.		Tons.	Cwts.
2	3	10	......	3	0
3	4	0	......	3	10
4	4	10	......	4	0
5	5	0	......	4	10
6	6	0	......	5	0
7	7	0	......	6	0
8	8	0	......	7	0
9	9	0	......	8	0
10	10	0	......	9	0
11	11	0	......	10	0
12	12	0	......	11	0

The allowances in column A apply to the counties of Cheshire, Cumberland, Darbyshire, Durham, Herefordshire, Lancashire, Leicestershire, Lincolnshire, Monmouthshire, Northumberland, Nottinghamshire, Rutlandshire, Shropshire, Staffordshire, Warwickshire, Westmorland, Worcestershire, and Yorkshire, and to Wales; those in column B apply to Bedfordshire, Berkshire, Buckinghamshire, Cambridgeshire, Cornwall, Devon, Dorset, Essex, Gloucestershire, Hampshire, Hertfordshire, Huntingdonshire, Kent, Norfolk, Northamptonshire, Oxfordshire, Somersetshire, Surrey, Suffolk, Sussex, and Wiltshire; Also to the Metropolitan Fuel Area, which includes the London metropolis together with outlying certain districts extending as far as Hemel Hempstead, Chertsey, Epping, and Leatherhead. Persons within a radius of about twenty-five miles of London should ascertain in which class, A or B, they come as regards rationing.

In the above table the rooms are reckoned for rationing purposes only when furnished and in actual occupation. Certain small rooms unprovided with fireplaces cannot be reckoned.

In making application for a supply of fuel on the above basis consumers will be required to declare the stock of fuel held by them at the time of making the requisition.

The above table of allowances applies to "fuel" used for heating. In addition to the quantities there set forth there is permitted the consumption of gas or electricity for lighting in accordance with the following table :—

Where the number of rooms occupied is	The lighting allowance for the year shall not exceed— either cubic feet of gas.	or B. of T. units of electricity.
1, 2, or 3	7,500	120
4, 5, or 6	11,250	180
7, 8, or 9	15,000	240
10, 11, or 12	18,750	300
13, 14, or 15	22,500	360
16, 17, or 18	26,250	420
19, 20, or 21	30,000	480

The allowance for lighting may be taken either as gas or as electricity or as some of each, the latter on the basis of 750 cubic feet of gas equivalent to 12 Board of Trade units.

It is also stated that gas or electricity allowed for lighting may, at the option of the consumer, be used for other domestic purposes, presumably for heating, but an extra allowance of coal on account of the lesser consumption of gas or electricity for lighting is not permitted.

It remains to be discovered how, in the case of a consumer who, as very many do, consume gas for both lighting and heating, it is possible to say how much is consumed for one purpose and how much for the other. In the absence of a separate meter or appliances using gas for the generation of heat it seems quite impracticable to set a limit, within the terms of the Order, to the quantity of gas which shall be used for lighting. The same applies, although in a much lesser degree, to the separate uses of electric current for lighting and heating.

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Assistants' Notes.

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Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication

A Home-Made Acetylene Generator.

THERE are few photographers, probably, who have not had need at some time or other of a simple illuminant for more or less temporary purposes. Either by reason of ordinary gas or electricity not being easily connected up, or because these are not available at all, use is perhaps made of a cheap paraffin lamp, or, worse still, candles. It is not only in the army that a photographer has to rig up a dark-room of sorts in a hurry for some special and urgent work; such has been the spread of photography that it is to be found in the most out-of-the-way corners of the globe, and it is those who have to work in unusual and perhaps make-shift circumstances that will find these notes useful, especially those who move from place to place, rather than the established urban photographer. Even he may find such a lamp as I propose to describe handy, for an outside showcase, for example.

In using the word "makeshift" I do not wish it to be thought that an acetylene lamp made in the manner shown below does not work as well as a commercial pattern. It undoubtedly does work as well as most, and even better than some. It is simply not so strong and a bit more bulky. On the other hand, it is far and away more portable. If this statement appears paradoxical, let me hasten to explain that the outfit that it is necessary to carry about consists solely of a gas-tap with a burner screwed into one side and a connection for rubber-tube in the other, a length of rubber tube, and, finally, tho body of an ordinary cycle-valve with a nut and a few washers of both rubber and metal. The whole lot will pack easily into a few cubic inches. The generator itself is constructed quickly and easily out of empty cans—to be found pretty well everywhere on this earth nowadays—and the tools required may be limited to a pair of pliers and a jack-knife. Even the pliers are not really essential.

It might be thought that by immersing ordinary tins in water, as is necessary to produce acetylene gas, they would very soon rust through and leak. Such, however, is not the case. The chemical action involved precipitates pure lime, and this not only prevents the formation of rust, but actually removes any that may be present. The cans need testing first of all by submerging them in water, open end downwards, when any leak will appear by bubbles of air escaping. The size and shape of the cans is immaterial, except for the general conditions that the larger they are, within reason, the better, and that tall narrow tins are better than squat ones, though I shall show how best to make use of these in cases where longer ones are not to be had. In every case the outside can, the largest of all, should never be of less than twice the capacity of the other two combined, and with advantage may be much larger than the proportion shown in the drawings. In fact, it may be dispensed with sometimes simply by immersing the other parts in any available tank, or even in a stream.

The most essential point in the whole idea is the bicycle-valve body with its nut and washers, shown in Fig. 1, and the method of fitting it. The washers need to be rather large in diameter, not less than an inch at the very least, and the rubber ones fairly thick and resilient. I have cut good ones from an old motor-cycle inner-tube, and if one is not thick enough it is easy to use two or more. In the sketches the metal washer is shown as solid black and the rubber by diagonal ruling. A hole is made in a can from the inside a little larger than the valve-stem. This is best done with a round tool, such as a marlinspike, if one's jack-knife boasts one, but a fair job can be made with the knife point by a steady drilling action. The burr, which will be very pronounced, is flattened by holding the end of a bar of iron or hard wood up under the hole and tapping the rough edges down and outwards till they lie as flat as possible. Very likely the result will be a hole anything but round, and the top surface far from even, but it is the purpose of the rubber washers to compensate for that sort of thing. The valve becomes a very efficient slip-on connection for the rubber tube.

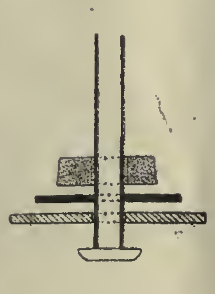
Fig. 1.

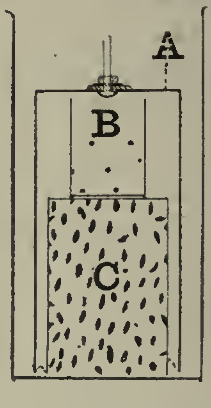

Fig. 2.

The simplest and quickest generator to make is shown in Fig. 2. A fairly large can, A, is fitted with the valve connection anywhere on the bottom. This is because it is inverted and becomes the gas-bell. I have lettered this can A in each drawing, and it is this one that needs the most careful testing for soundness. In no case is it recommended to have this of less than one quart capacity, and one gallon is a good size for running one or two burners. The purpose of this can is to hold any overmake of gas, which would otherwise escape and smell. At the same time it regulates the admission of water to the carbide. When the tap is turned off it holds the unconsumed gas ready for use next time it may be required, and this forces the water away from the carbide remaining unused. B is the carbide holder, and in this case may be any handy tin, soundness being no object. It needs a few very small holes to be punched around the lower part, as shown by black dots. C is merely a tin to act as a stand for B, and should be punched with plenty of holes all over, so as not to interfere with the free passage of water. A also needs a few holes or notches around its open edge to allow water to flow in and out easily.

This pattern of generator is started by half filling B with carbide. (The lime precipitated always takes up a lot more space than the original carbide.) It is then stood on top of C in whatever vessel is used for the outer tank, which must always be taller than the gas-bell A, as well as larger in diameter. A heavy weight is needed to keep the gas-bell from rising in the water, or some other means of pressure may readily be improvised in several ways. The rubber tube is slipped on to the valve and on to the tap. The latter, with the burner, can be turned into a gas-bracket with any old piece of wire, or a strip of wood and two or three nails. The tap must always be turned off when starting, and the whole thing connected up to the burner before turning on the tap. When it is all ready, fill the tank with water till A is well submerged, and turn on the tap. It will take a little while for the air in A to escape and begin to be replaced by gas, which can be recognised by its smell. It is a good rule to allow this length of time to elapse, rather than let out some of the air otherwise than through the burner, first of all for one's own safety, and secondly because a generator started badly often behaves horribly all through that particular charge of carbide. As soon as the smell is strong, light up and regulate the flame by the tap. If the flame is not as large as it ought to be, more water in the tank will give the greater pressure required. What are called "atmospheric" burners are best for running on this sort of generator, as, unlike the ordinary acetylene burner, they can be turned up and down without becoming choked with soot. Brays make a variety of acetylene burners to suit all purposes.

The other generators shown are merely elaborations and are used in just the same way. In Fig. 3 C has been done away with, and B is a tin with "hermetic" or push-in lid. It is fixed inside A by passing the valve through both tins, and is filled by means of the lid. A is notched round its edge as before. B also requires a few extra holes near the top edge to allow gas as it is made to pass out into the bell, A. This pattern is about the best all-round, both to make and use.

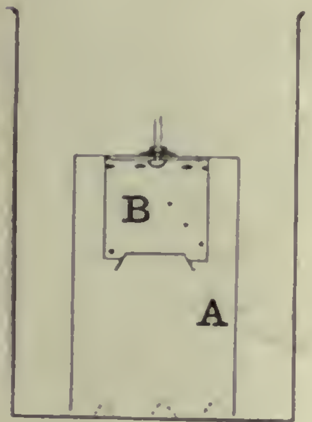

Fig. 3.

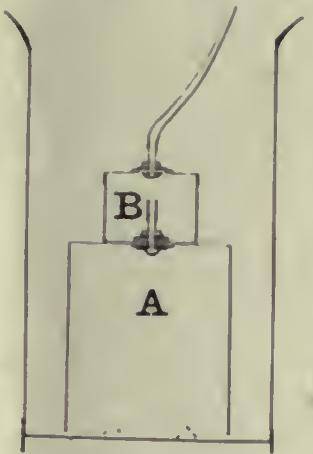

Fig. 4.

Fig. 4 shows a design which is not recommended for general use, but is for cases where tins of rather flat shape are all that can be had. For this, two valves and sets of washers are required, the carbide-holder being outside the gas-bell and water admitted through the lower valve, which can be lengthened, if necessary, by a short bit of rubber tube. B should be ample in size, as space must be allowed for a little gas in it every time the water comes up, otherwise the light will go down, and sometimes go right out. The only thing that is likely to give trouble in this pattern is the lid of the carbide-holder, which must be easily removed for cleaning and charging up, but requires to be gas-tight when closed. One way of overcoming this difficulty is shown in section in Fig. 5. A rubber band, D, is passed round the body of the tin just below the slip-on lid, E. If there is a seam in the body of the tin it is filled up where the rubber band is with rubber solution, elastic glue, or other waterproof stuff that may be at hand. F is a broader rubber band that goes round over the first one, and is bound on to it with string. It springs on to E, and makes a water and gas-tight joint, and can be rolled back for opening the tin. I have cut suitable bands from motor inner-tubes. It may be found not easy to tighten the nut of the inner valve quite enough to secure the required compression of the rubber washers. However, when it has been screwed up enough to get a grip the rest can be done by merely turning the two cans in opposite directions, and the valve will be tightened up in doing so.

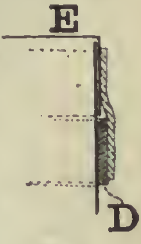

Fig. 5.

A very handy method of weighting the gas-bell, A, to keep it from floating up to the top of the water container, is to bend a bit of lead pipe round the bottom edge and tie it there with bits of wire or string through holes pierced in the can. This simplifies matters considerably, especially where the outer tank is rather large.

Another refinement that assists considerably is a false bottom to the carbide-holder, B. This may be of wire-netting or a bit of tin punched with holes. Its purpose is to allow a little space for surplus water to drain off the carbide and to support a disc of canvas or other old material that may be at hand. All the lime sludge settles on this, and when charging up it is all pulled out together with the bit of old rag instead of clinging rather obstinately, as it is apt to do, to the bottom of the tin. It is a matter of a couple of minutes only to empty the carbide-holder by this method and re-charge with a fresh bit of rag and some more carbide. A supply of cloth discs can be cut ready and stored along with the stock of carbide. They should be just a little larger in diameter than the inside of the tin, so as to fit well against the sides all round. No special care is needed to make very good circles, and the very slight extra trouble in applying this dodge will be amply repaid not only in the time saved in re-charging the lamp, but also by an increase in the steadiness of the light.—D. Charles.

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A Goole War Memorial with a German-made Picture.—In connection with the erection of a memorial to Goole officers and men of the mercantile marine, there has been a display of feeling because a picture it contained, representing the Biblical incident of Christ with His disciples on the Sea of Galilee, bore the embossed stamp of the Berlin Photographic Company. An agitation for the removal of the picture was set on foot, and as the memorial had been arranged by the local members of the Church of England Men's Society representations were made to the president of that body, the Vicar of Goole, and he promised to have the picture taken down. No immediate action was taken, and in consequence a number of people threatened to smash the memorial and tear down the "made in Germany" picture. A public meeting was held in front of it, and the chief promoter of the agitation (Mr. Fred Brunyee) asked those present not to take any drastic course until the vicar had had time to get his instructions carried out. This advice was taken, and a workman, acting on instructions given by the vicar, removed the picture from the memorial. Another public meeting was held in front of the memorial, and was addressed by Mr. Fred Brunyee, who said he had promised the vicar that if the memorial was damaged he would subscribe £10 towards the erection of another. He was glad the people of Goole had not damaged the memorial, and for that reason he was giving the £10 to the local hospital. He was also presenting to the workman who took down the picture a War Saving Certificate, as he considered the man had earned a good day's wage.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications June 10-22:—

Cameras.—No. 9,741. Photographic cameras. S. P. Twemlow.

Cinematography.—No. 10,106. Flicker shutter. H. W. Abbott.

Photography.—No. 10,054. Photography. D. Gestetner.

Cinematography.—No. 10.019. Cinematograph projectors. J. W. Harris.

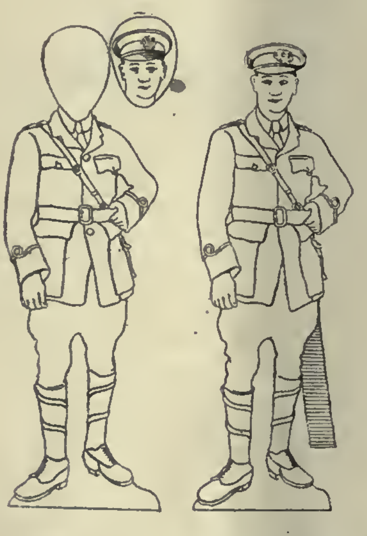
COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Combination Photographs.—No. 115,967 (July 26, 1917). The invention consists in the method of making photographic representations of persons in uniform or other costumes, which consists in first photographing a person in any desired uniform or costume, removing the head and neck from such photograph, affixing the prints of the photographs (minus head and neck) to cardboard or the like. A hollow cutter is formed the shape of which corresponds to the outline of the photograph, but with an outline at the top of the cutter considerably larger than the head and neck. The prints of photographs affixed to cardboard are cut out with the cutter (with a blank piece of cardboard at the top larger than the head and neck). Then a photograph is made of the head of any person desired of corresponding scale to that of the body and a print of the head affixed to the blank portion of cardboard at the head of the body, and then the extraneous cardboard is cut away by hand around the head and neck, to thus form the finished photographic representation. In the drawings Fig. 1 is the representation of a person in uniform with head and neck removed, cut out to the outline with a hollow cutter. Fig. 2 represents the head of a person of corresponding scale to be affixed to the blank space above collar shown in Fig. 1. Fig. 3 is the finished representation after the head, Fig. 2, has been affixed to the space above collar in Fig. 1, and after the extraneous portion of cardboard around the head and neck has been cut away. Edwin Tearle Caldicott, 81, Farringdon Street, London, E.C.4, and Julius Frenkel, 16, London Wall, London, E.C.2.

Fig. 1. Fig. 2. Fig. 3.



Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Mecorl.—No. 382,919. Photographic chemicals, plates, and films. Reginald Evison Carter, 39, St. James Street, Piccadilly, London, S.W.1; manufacturers' agent. April 13, 1918.

Metzol.—No. 382,950. Photographic chemicals. Metzo, Limited, Scots Bridge Mill, Ricksmansworth, Hertfordshire; manufacturers of and dealers in photographic paper and chemicals. April 17, 1918.

Alpha.—No. 383,031. Prepared paper for photographic purposes. Ilford, Limited, Britannia Works, Roden Street, Ilford, Essex; manufacturers of photographic plates, paper and films. April 23, 1918.

REGISTRATIONS RENEWED.

Elge.—No. 264,168. Registered by L. Gaumont and Co., in 1904, in Class 1.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, July 13.

Hackney Photographic Society. Outing to the Zoo.

Monday, July 15.

South London Photographic Society. The Perfect Negative. Members.

Tuesday, July 16.

Hackney Photographic Society. Monthly Competition. "Fishing."

Friday, July 19.

Halifax Scientific Society. Lecturette at Elland Park Wood.

South London Photographic Society.—Mr. Chas. H. Oakden, F.R.P.S., in lecturing before the members of this society on "The Principles Governing the Practice of Photography in Colours," remarked that it is difficult to get people to understand that white light is capable of being split up into component parts, each part being a sensation of colour. Most people are, however, familiar with the colours projected by a prism when strong light strikes it. The colours thus produced are always in the same sequence as those in the rainbow. If certain coloured pigments are mixed together black is produced, but if the same colours are separately projected and mixed they no longer produce black but white. The visible colours in the spectrum are red, orange, green, blue, and indigo, but there are, however, rays at both ends which, although invisible to the naked eye, demonstrate their existence if allowed to act upon a photographic plate. For instance, ultra-violet is one of the rays to which the ordinary plate is sensitive, but in order to be able to obtain a record of the ultra-red rays it is essential to use a red-sensitive plate.

In colour photography the overlapping of the three primary colours produced a sensation of a picture in natural colours.

He believed that the new Ilford panochromatic plate is sensitive to the whole range of the spectrum, therefore it would have to be handled in complete darkness. It had a different ratio from other colour-plates where exposure through a set of two colour-screens is concerned.

When used in conjunction with the blue and red screen the plate would require the same exposure for each, but in the case of the green screen it would only require from quarter to half more.

The principle of dividing the light into the three primary colours is applied to the Autochrome plate. Starch grains are sifted, dyed to the three primary tints, and afterwards dusted on to the adhesive surface of the plates in correct proportion and then rolled. The plate is then coated with a panochromatic emulsion and used in conjunction with a reddish-yellow screen.

In dealing with the Paget Colour Process Mr. Oakden explained that the negatives obtained by this process could be used for contact prints and enlargements up to 10 x 8 or 10 x 12 from ¼-plate size. The results so obtained are more delicate, pleasing, and truthful than those obtained by the use of ordinary plates. He further pointed out that if a so-called colour-sensitive plate can be handled in any kind of light it is blind to that portion of the spectrum represented by the light in which it can be safely handled.

The lecturer concluded by alluding to the tremendous advances made in the discoveries and production of new aniline dyes, and ventured to hope that the new bases which British chemists had discovered would keep the German-made dyes off the British market.

News and Notes.

Society of Master Photographers (Lancashire and District).—A general meeting of the above society will be held on Tuesday, July 16, at the Bee Hotel, St. John's Lane, Liverpool. The chair will be taken by N. S. Kay, Esq., at 6.30 p.m. The rules and bye-laws of the society, drafted by the committee, will be submitted for confirmation. In addition, there will be an interesting agenda for discussion, and it is hoped that an address will be given by a noted Liverpool photographer. All master photographers in Liverpool and surrounding districts, including Birkenhead, Wallasey, and Chester, are cordially invited to attend this meeting. All applications from master photographers for membership (the subscription to which is 10s. 6d. per annum) should be addressed to the Hon. Sec., F. Read, 14, Balfour Road, Southport.

Tribunal Appeals.—Mr. S. A. Chandler, photographer, Exeter (43, Grade I), a conscientious objector, was given exemption by the local Tribunal on the condition that he went to work on the land outside an area of fifty miles from Exeter. The military appealed.

Mr. Chandler said he held strong conscientious objections to war as a means of settling international difficulties.

Examined by Mr. Holford Knight, his counsel, Mr. Chandler said he understood the serious position of his country, and realised the responsibility of every citizen. He was quite prepared to comply with the conditions of the local tribunal, although they were very hard. Some time ago he was convicted by Exeter magistrates for distributing certain pacifist literature, and the chairman, who sent him to prison, presided over the local tribunal.

The Chairman: Never mind that.

Mr. Chandler said he received sentence of two months' imprisonment, which was reduced to one month. This conviction established his views.

The Chairman and Mr Kekewich dissented, and said a man might distribute pamphlets for other reasons and from other motives than entire agreement with what the pamphlets contained.

The Chairman: Tell us, in a few words, why persons should not defend themselves when they are attacked.—I hold that opinion very strongly.

Would you sit still and wait till the enemy came rather than take any part to keep him away?—I could not do anything that would entail the killing of my fellow man. I am risking great unpopularity and a loss of business by the stand I am taking. I have held my views for years. I attended a peace meeting in Exeter some months before the war.

Are you prepared to take any part as a non-combatant?—Under no circumstances whatever can I have anything to do with the military machine.

Mr Lawson (National Service representative): Do you take photographs of soldiers?—Yes, in the course of my business.

Mr. Lawson: That is part of the military machine.

Mr. Kekewich: Suppose your shop were raided, would you send for the police?—My place has not been raided and is not likely to be.

The appeal of the military was dismissed, but the further condition was attached that Mr. Chandler should do work upon the land not only fifty miles from Exeter but an equal distance from Southampton, where he also has a business.

The Chairman added: We accept your statement that you are genuinely opposed to war, and we regret your attitude, but we hope you will do your best to make up for it by helping to grow food that the country requires.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

R. P. S. JOURNAL: A CORRECTION.

To the Editors.

Dear Sirs,—May I ask your kind assistance in correcting an unfortunate printer's error in the June number of "The Photographic Journal"? In the review of the Ilford Rapid Panchromatic Plate, on page 229, the limit of the even sensitiveness is given as from 400 to 585; this should be as from 400 to 685.—I am, yours faithfully,

J. McIntosh.

RECOVERY OF HYPO.

To the Editors.

Gentlemen,—It has been said of medicine that experience and observation of the facts is the first law of its fundamental principle. In like manner, the same may be said of photography. My experience in the recovery of hypo differs considerably from many. In the first place, I always recover the silver from a print fixer with a strip of zinc and then filter, strengthen with fresh crystals of hypo, and I find in practice it works nearly as good and as clear as a first bath. Soda is also good, but is slower and turns a bath brown quicker. I have used a bath after three times treated with zinc, but the third time it gets bubbly and brown.

In any case, it is not a wise plan to prolong the fixing of plates for more than ten minutes, because it wastes time in washing, and, if the bath is oldish, may cause slight stain.—I am, Gentlemen, yours respectfully,

Henry Holman.

AMERICAN AND BRITISH PHOTOGRAPHIC JOURNALS.

To the Editors.

Gentlemen,—Hats off to Mr. John A. Tennant, worthy editor of the "Photo-Miniature," who has come to the defence of the policy governing the American photographic periodicals. The remarks in my previous letter, to which Mr. Tennant objects, had no application to the "Photo-Miniature," which I have come to regards not as a periodical, but rather as a series of interesting and valuable treatises which should form part of the library of every photographer.

No apology for my ignorance on the subject of American photographic periodicals appears to be in order, however, because I buy and read them all, and the periodicals themselves are evidence of the truth of my earlier statement.

That the "fuzztype" photograph still looms large upon the horizon of the American photographic editors is evidenced by the large numbers of such "efforts" which regularly appear in their respective publications, to the detriment of the text in many instances. Being a mere man, I must admit my susceptibility to the influence of a charming figure posed "in the altogether," or to a delightful landscape study, but when, as frequently occurs in the American photographic magazine, a technical article is cluttered up with illustrations of such character, the serious attention of the student reader is caused to waver, to the detriment of the text, of course. Naturally enough, then, one who takes his photography as a serious branch of scientific study is distracted at finding a good article invaded by a salon of photography which had better been divorced from purely technical subject-matter, and one turns to publications where subjects relating to the fundamentals of the photographic process are presented in a businesslike and straightforward manner, untrammelled by the widely divergent matters which are so interesting to the pictorialist and the gum-splodger.

It is thus seen that no sweeping denunciation of American photographic journals was intended by my previous remarks, because the American photographic publications are works of great enterprise, and are doubtless highly appreciated by the average reader.

Students of photography, who like myself are seeking evidence of new developments in the science, are generally agreed that articles relating to purely technical subjects are more readily digested where unaccompanied by exhibitions of pictorial effort, and as a prompt purveyor of the most recent developments in matters photographic, I find the "B.J." to reign supreme as the newspaper of the photographic industry in English-speaking countries.

With compliments to the American photographic editors, and with apologies for having trespassed upon so much good space.—Yours faithfully,

ALFRED S. CORY,
Technical Editor, "Motion Picture News."
729, Seventh Avenue, New York, March 18.

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Answers to Correspondents.

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SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 6-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

M. R.—We should say from £2 to £2 10s. a week would be a fair figure.

SIGMA.—There is certainly something in what you say. We deal with the subject in an "Ex Cathedra" note on another page.

J. D.—There is no reason why you should not use a portrait lens for copying ordinary photographs. It is not adapted for plans or similar work.

S. E. TAYLOR.—The firm has not been in existence for a year or two. Try Messrs. H. T. Ball and Co., 54, Berwick Street, Oxford Street, London, W.

DARK ROOM HAND.—None has been formed. Various projects have been put forward from time to time, but they have come to nothing, chiefly, we think, from a lack of any constructive programme.

VARNISHING.—If you really do find a difficulty in manipulating a cold varnish, the best advice we can give you is to write to the Vanguard Company, Maidenhead, for a circular of drawings showing exactly how to handle the negatives when applying the varnish.

ACETIC ACID.—I see from the chemical catalogues that there are various grades of acetic acid, ranging from the so-called "glacial" to others of much lower strength. Where this acid is directed in formulæ, could you tell me which strength is meant?—KNOWLEDGE.

Unless a special weaker strength is specified it is, we think, an invariable rule that the glacial acid is intended.

J. S. HORNE.—All the lenses you name are of first-rate quality, and there is very little distinction to be drawn between them. The best choice you can make is one of the maximum aperture which you require. If you do not want a greater aperture than *f*/6 you will do better to buy a lens of this maximum aperture, not only as regards price, but also as regards optical performance.

VASCO.—You will require dishes about 25 x 7 ins. and about 3 ins. deep for developing strips of six postcards. These can be ordered from any dealer, or from Mr. G. S. Moore, 69, Denmark Hill, S.E.5, who, we believe, makes them in vitrified enamel. A home-made dish of wood with a glass bottom will answer well if you cannot, through war conditions, get the commercial article. Strip printing is very simple, but why use daylight when you can get a steady uniform light from oil, gas, or electric current?

GRINDING LENSES.—Is there any book which you can recommend for an amateur anxious to grind his own telescope lenses, and where should one apply for obtaining the most suitable description of glass? Any information would be valued by LEX.

We can best refer you to the "English Mechanic," in which at the present time is appearing a series of articles by the Rev. W. M. F. Ellison, an expert amateur telescope maker and optician. The chief makers of optical glass are Messrs. Chance Brothers, Oldbury, Birmingham, but it is pretty certain, particularly at the present time, they would not be prepared to be troubled with small orders such as yours. Possibly the Editor of the "English Mechanic" could tell you of some other source of supply.

GLAZING POSTCARDS.—It is not uncommon for new glasses to behave as you describe, you have certainly done more harm than good by using soda, which has a tendency to corrode the surface. We have found the best way of "seasoning" to be by rubbing the surfaces with French chalk, freshly scraped from the lump (this is important). The chalk must be rubbed on with great pressure until the glass has a sort of smoky bloom, when the surface is dusted with a soft cloth and the cards laid down as usual. The first lot may have a slight bloom from the chalk but not enough to spoil the cards. After this the glasses should work all right with the oxgall as you use it on the old glasses. We think you would find mixing formaline with the oxgall an improvement over the green soap.

M. W.—1. Write to the Vanguard Company, Maidenhead, for illustrated reprint from the "B.J." on the making of firelight photographs. 2. More or less sulphite in the amidol developer will not make any difference to plates or prints. The description of the developer has some effect, inasmuch as one which is more alkaline than another certainly is a factor tending towards the frilling; but the difference is not really very great. The best thing you can do is to stick to the amidol formula, which is the least alkaline of any, and to fix prints in a hardening-fixing bath. 3. Chromo alum is somewhat more effective than ordinary alum for hardening; but, as we have just said, the best thing is to fix and harden at the same time. 4. If you trade under a name other than your own it will be necessary for you to register. The fact that your work is done privately makes no difference.

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PHOTOGRAPHERS AND THE ROYAL AIR FORCE.—Some misunderstanding has occurred in regard to providing the R.A.F. with photographers through the Professional Photographers' Association, and readers are asked to wait for any further announcement that may be made before addressing either the P.P.A. or ourselves on the matter.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as the acceptance of "returns" by a publisher is now prohibited by the Government. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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SUMMARY.

The first instalment of the Hurter and Driffield Memorial Lecture, delivered by Mr. W. B. Ferguson, K.C., at the Royal Photographic Society, which we reprint from the Society's "Journal," commences on page 327.

In a review of methods which have been the subject of experiment for the purpose of finding a more rapid process of single-solution sepia toning than hypo-alum, and at the same time one which can be used cold, we refer to several methods, the principle of which is the conversion of the silver image into a compound which is more readily acted upon by sulphide, the converting compound nevertheless being one which can be kept in solution with sulphide. (P. 322.)

Suggestions as to the desirability of testing the capabilities of convertible lenses before purchasing, and pointing out the advantages of this type of lens in general, form an Ex Cathedra paragraph on page 321.

In an article which we quote from *American Photography*, Mr. Arthur Hammond has some useful hints to give on the precautions which may be taken as a means of obviating the want of symmetry between the two eyes and between the two sides of the nose in the case of many sitters. (P. 325.)

Formulæ and working instructions for the various iron printing processes are given by Mr. Clement Priseman in an article on page 324.

Some hints as to economising in the consumption of coal, gas, and electric current will be found on page 321.

The question of the relative advantages of slow and fast plates for various classes of work, with the result of a rather striking experiment, is discussed on page 322.

The Board of Trade have issued an important notice revoking the general licences under which payment of patent fees due in enemy countries has hitherto been permitted. (P. 331.)

A useful method of lightening the background of negatives when it is not desired to block them out entirely, is detailed on page 330.

The National Physical Laboratory is now prepared to test chemical glassware, and will send a pamphlet of instructions to persons desirous of availing themselves of this offer. (P. 326.)

Several useful mechanical and manipulative aids to blocking-out negatives of commercial subjects will be found in "Assistants' Notes" on page 330.

Several questions relating to lenses, defects in bromide printing, and the effect of changing the illuminant in the enlarging lantern are dealt with in "Answers to Correspondents" on page 332.

A suggestion for locally strengthening the light tubing usually fitted to aerographs, so that constant splitting is avoided, is given on page 331.

EX CATHEDRA.

Conversible Lenses. When purchasing a lens the first consideration is, of course, its suitability for the particular work in view, a view which must take precedence of all others. The next point to be considered is its adaptability to other classes of work, as later on this may save the expense of another instrument. For example, the selection of a group lens with sufficiently large aperture will save the expense of a portrait objective of the same focal length, while a rapid lens for small work may answer admirably for wide-angle views on larger plates. In like manner, when a rapid lens of medium size is to be selected it is as well to consider the claims of the convertible type, which permits of the use of the single components when a larger image is required on a given size of plate or a larger plate has to be covered. Some caution is necessary when choosing a "convertible" anastigmat, as many so described will not give a sharp image except at a very small aperture, while others give critical definition at the full opening. As a rule, one at least of the components has a focal length twice that of the complete lens, so that when using it the *f* numbers are doubled, *f*/6 becoming *f*/12 and *f*/8 becoming *f*/16. The modern single lens is usually very different in its performance from the older types or from the single components of a rapid rectilinear, as not only is there practically no distortion but the spherical correction is excellent. The safest course is always to obtain a lens on trial before purchasing, and to test carefully the complete lens and the single components. There will then be no uncertainty as to the practical value of the instrument.

* * *

Coal, Gas and Current. The Fuel and Lighting Order which came into effect at the beginning of this month, and of which we gave an abstract last week, call for serious consideration by every householder, and not the least by photographers. While it is not specifically stated, it may be taken that the current supplied at "power" rates comes within the scope of the Order, and it is certain that gas and current used for ordinary lighting together with coal does. Therefore, it seems to us that people carrying on a business on their residential premises will have to be even more economical than private occupiers. The thing to be done without delay is to review all fittings, stoves, and the like, with a view to reducing consumption. Taking coal as a start, the old wasteful open fireplaces must be abolished. In reception and dressing-rooms slow combustion fires of the bar-less variety should be fitted, thus reducing the fuel consumption by nearly one-half. This is not an expensive matter; any ironmonger will supply the new grates at a cost of ten shillings or so, and they are easily fitted by an ordinary person. In work-rooms and in the studio closed stoves burning anthracite or ordinary coal, with or without a proportion of coke, should be used. It is poor economy to freeze one's workers, and quite a small Tortoise stove will keep a fairly large room comfortably warm. Moreover, any waste wood, card, or other combustible material will serve as fuel. Much economy in gas consumption may be effected by replacing upright incandescent burners with Bijou inverted. These give practically as much light with half the consumption of gas, besides being more economical in the matter of mantles and glasses. Gas fires will have to be used sparingly, and, if of old pattern and not securing the greatest return in the way of heating from the gas consumed, should be discarded in favour of better models. It is not now a matter of cost, but of the total quantity of fuel consumed. Economy in current may be effected by using new lamps so as to avoid loss of light through the blackened globes, and if possible fewer lights should be used. The small half-watt lamps are valuable in this respect, as one will light quite a large room at a minimum cost for current. Electric heating is expensive, as much current has to be consumed to produce any appreciable amount of heat, and current users will do well to reserve their supply for lighting. On the question of studio lighting, nearly all that is necessary has been said. Half-watt lamps are certainly most economical as far as current is concerned, but there is a temptation to keep them burning longer than is really necessary. Every lamp should have an independent switch, so that only those actually needed are kept burning.

* * *

Dating Stock. Photographers might well take a hint from the photographic dealers and most other traders in the matter of using materials in the order of their delivery from the makers. The wise dealer, when he receives a fresh supply of plates, paper, or mounts, takes care to bring the remainder of the last batch to the front of his shelves so that it may be sold first. In many studios there is a great lack of proper storage accommodation, and new stock is often started upon before the old is worked off. This may or may not be serious, as the conditions of storage are bad or good, but in any case it is an indefensible practice. Only costing a few pence, a rubber dating stamp may save many pounds by distinctly showing which of two packets of plates or paper should be used first. There is always a tendency on the part of assistants to want to get on with fresh stock, especially if the last batch has not been quite up to the usual level. But if it has to be used it will not improve by keeping. In like manner, a very good receptionist may lose her head over a new style of mount, and recommend them to all and sundry when there is a room full of equally attractive styles which have been paid for in hard cash waiting to be worked off. Photographers should always remember that the cost of all dead stock comes off their net profits.

* * *

Slow and Fast Plates. Many photographers in their choice of a plate seem to be governed by the idea that speed is the chief characteristic to aim for. There are, however, many examples to be seen in the way of enlargements exhibited in professional show-cases, that go far to prove that a fine grain plate is far more suitable, when enlarging is contemplated, than one of the ultra-speedy grades. Whatever the makers may say, extreme speed and ultra-fine grain can never go together to the extent that the latter quality is found in the slow, or ordinary, plate, and I am sure that many operators do not know the value of these slower emulsions, for much of the general work that they are called upon to carry out. In an enlargement, grain is most objectionable, and requires a lot of hand-work to remove, and much of this could be avoided if operators looked with more favour on the slower plate. For indoor work the exposures are not too long for the average adult sitter to keep still, but it is in out-of-door work, groups, etc., that the slow plate is found at its best. Its powers of rendering detail, and contrast, are far in advance of the ultra-fast emulsion, and the resulting prints are undoubtedly finer. Even on the ground of rapidity it is not always the fast plate that scores, for on one occasion we were led to make a simple experiment.

* * *

A Comparison. Two plates (one 500 H. and D., and the other 200) were taken, and each given an exposure of 1-100 8, on a dull December afternoon, the stop in use being *f*/8. Consequently, both negatives were much under-exposed. The fast plate, which it was known would stand but little forcing during development, was dealt with by the Watkins' method of time and temperature, while the slower one was forced in a double strength solution warmed to 75° F. When comparing the resulting negatives, we were surprised to find that the slower plate actually had the more density and detail, and was no more "grainy" than the other. The use of a slow plate also tends towards the comfort of the operator, a brighter light may be employed in the dark-room without risk of fog; while during development, whatever system be employed, a saving of time is effected. Slow plates invariably give a better rendering of colours, probably because the secret of success when using them is in giving a generous exposure, whereas if an ultra-rapid plate was employed, we should probably give the minimum, and a full exposure enables these colours to impress themselves more fully upon the emulsion. It is certain that if given a full exposure and not over-developed the slow plate is as fine a negative medium as any operator could desire; yet we met a photographer recently who confessed to never having used them, and we believe that if the claims of the slow plate were more widely realised outside its own especial field—i.e., copying, process work, etc., it would be much more widely utilised.

SINGLE-SOLUTION SEPIA TONING: VIEWS AND REVIEWS.

I.

It may be said that the method of sepia toning of development prints owes its popularity to the working out to a quite practical point of the now universally employed process of bleaching and darkening, as most commonly embodied in the use of a bleach of bromide and ferricyanide and of sodium sulphide as the toning or darkening bath. Yet it is well to remember that this process is of later date than the hypo-alum method of which, except on the industrial scale, far less general use was made. The double process of bleaching and sulphiding, although chemically a longer way round, is actually a short cut in practice, and at the same time more complete in its toning action. In the difference between the two we have an illustration of a thing which is fairly common in chemical operations, namely, that in order to secure the combination between two chemical elements, in the present case between silver and sulphur, it is very often more expeditious to proceed by somewhat devious processes than by causing the two elements to act directly on each other or to act on one with a compound of the other. In other words, it is in fact simpler to convert each element into a compound and to cause these two compounds to act on each other. This is what is done in the sulphide-toning process.

By the use of the bleach the photographer converts the silver of the image into silver bromide; he buys his sulphur in a form (soda sulphide) in which the manufacturer has combined it with sodium. Thus in the darkening bath he brings into play a different chemical reaction in which the action of the sulphur on the silver is helped and, it would appear, rendered complete, by the chemical attraction of the other elements, sodium and bromine.

This process, as every photographer knows, has certain positive advantages. It is rapid—though it is roundabout, it is several times as fast as hypo-alum—and its action is a complete one, whilst that of hypo-alum is partial. Given reasonable precautions, it is as certain in its results as any toning process, and there is nothing to complain of in the colour and general quality of the toned prints, even though these latter are found to vary to a minor degree according to the brand of paper and the photographer's practice in making the black prints. Yet with these various features in its favour it cannot be denied that a more perfectly satisfactory method of making sepia development prints is a desideratum of some importance, and one which has been in the minds of experimenters in the paper-makers' factories and out of them. The manufacturer has in his eye a paper which develops to a sepia with the same ease and certainty that the present papers develop to black, or at any rate one which is specially adapted for the simpler production of sepia prints. In every board-room they would tell you that there is a large market awaiting such a paper as this. The attainment of the same result with existing papers by a more expeditious toning process, on the other hand, interests the manufacturer less than it does the independent experimenter, for the money to be made out of a toning process is insignificant in comparison with that from an equally popular printing paper. The latter, if and when we get it, will undoubtedly result from the private research of one or more manufacturers: the toning process is more likely to come from the original experiments of some worker who shall succeed in devising a combination of chemicals or modifying a previous mixture. As a means, therefore, of encouraging such experiment, and possibly of saving useless labour, it may be of service to review the attempts which have been made to devise a method of single-solution sulphide toning and to endeavour to trace the principles by which their authors have apparently been guided.

The earliest modification of the hypo-alum bath which we can trace is that published in 1907 by Mr. Milton B. Punnett, then, and we believe now, a works chemist of the Eastman Kodak Co. The chief new component of Mr. Punnett's toning mixture (B.J. Almanac, 1908, p. 653) was ammonium sulphocyanide, of which in 20 ozs. of water there was approximately 520 grains, with 220 grains of hypo, 45 grains of alum, and 45 grains of soda sulphide. At a temperature of 90° to 100° F. this bath was found to yield a purplish P.O.P. tone in five to fifteen minutes. It may be judged that its quicker toning action is connected with the formation of cyanogen compounds having a slightly solvent action on the silver image. For a bath which requires to be used in the heat its relatively large proportion of sulphocyanide is a drawback, owing to the softening action of this latter on the gelatine film. It was, no doubt, for this reason that Mr. Punnett directed that it should not be heated above 100° F.

The next record we have of a bath of this kind is the suggestion of Dr. F. Kropf, consisting of ammonium sulphide, ammonium bicarbonate, and potassium persulphate (B.J. Almanac, 1912, p. 618). The bath was compounded by mixing 4 parts of 2½ per cent. solution of soda sulphide, 1 part of 3 per cent. ammonium bicarbonate solution, and 1 part 1 per cent. potass persulphate solution, to be used within about half an hour of making up, during which time the colour of the mixture changed from greenish yellow to golden yellow. The time required for toning at the ordinary temperature ranged from fifteen to thirty minutes. It is clear from the formula that the act of mixing the three constituents is bound to alter them considerably. The sulphide is a most oxidizable substance: the persulphate, a powerful oxidizer. Hence the mixed bath will contain the oxidation product of the one and the reduction product of the other, probably some ammonium polysulphide and potass sulphate. Apart from the direct action of sulphide on the prints, the Kropf bath no doubt owes its greater action to the polysulphide which is formed in it as well as to the solvent action of residual persulphate on the silver image, forming some compound which is converted on the instant into silver sulphide.

Now if a mixture of sulphide and persulphate, which latter converts the silver image into a soluble compound, serves to facilitate the toning action, a much better mixture should be one in which the sulphide is mixed with something which converts the silver image into a compound which is insoluble, but convertible into silver sulphide by the soda sulphide. On this basis on the publication of Kropf's formula we made trial of a mixture of ferricyanide and sulphide, with addition of bromide and acetic acid, and found it to tone a bromide print to a good brown in ten or fifteen minutes (B.J., November 4, 1910, p. 835). Here, it is to be presumed, the silver image is converted into bromide by the bromide and ferricyanide and, as it is formed, is changed into sulphide. Mr. Blake Smith subsequently (B.J., February 24, 1911, p. 140) evolved a working formula on simpler lines, employing only sulphide and ferricyanide, with addition of sulphuric acid. His bath was compounded from three stock solutions, viz., A. Soda sulphide, cryst., 4 ozs.: water to 16 ozs.; B. Sulphuric acid, conct., 1 oz.: water to 10 ozs.; and C. Potass. ferricyanide, 1 oz.: water, 10 ozs. The bath, toning in two to five minutes, is made by adding 1 dram of A. to 2 ozs. of water, and then adding 2 drams of B. and 1 oz. of C.

An English patent of 1910 granted to Dr. W. Triepel (B.J. Almanac, 1912, p. 620) is on very similar lines, the cold single-solution toning bath containing ferricyanide, bromide, and sulphite, but having the sulphur in the form of thio-urea and with a small proportion of caustic alkali. Subsequent to this specification of Triepel's there has not been, so far as we know, any publication of experiments along the same lines, that is the incorporation with a solution of sulphide of means for the conversion of the silver image into a compound quickly convertible into sulphide. The problem for the experimenter is to find a substance or group of substances which acts on the silver image as quickly and cleanly as does, say, the ordinary sepia-toning bleach of bromide and ferricyanide, and at the same time is what the druggist call "compatible" with soda sulphide. By "compatible" in this connection we mean capable of being kept for a reasonable time in solution with sulphide without any chemical reaction taking place. For the purposes of commercial sepia toning it is necessary to have a degree of freedom from chemical interaction a good deal greater than, say, that in the case of Farmer's reducer of ferricyanide and hypo where the time during which the two remain unaffected by each other is a matter of minutes. It is scarcely conceivable that a toning bath would be regular in its action unless of much greater stability than this—a compromise between maximum action on the silver image and minimum action on the sulphide or, as in Triepel's formula, on a sulphide compound which functions as sulphide in the conditions of the process. Obviously oxidizing agents such as the per-salts of the heavy metals—copper chloride, mercury bichloride, or even ferric chloride—are out of the question as converting agents inasmuch as they are instantly precipitated by sulphide, and therefore the required oxidizer is to be sought among substances such as bichromates, ferricyanides, in which the oxidising action is associated with an acid radicle. The use of compounds such as thio-urea containing the sulphur in a different form of combination is probably a likely direction in which to seek the required "compatibility" of the bleaching of the sulphiding components of the mixture.

IRON PRINTING PROCESSES.

The Ferro-Prussiate Process.

Of the many printing papers which have been introduced few have stood the test of time so well as the ferro-prussiate. Engineering draftsmen and the like owe a debt of gratitude to Sir John Herschel for discovering the "blue-print" process which enables them to take copies from tracings and negatives with maximum speed and at minimum cost.

In view of the fact that a roll of the sensitised paper 30 ft. by 30 ins. can be purchased for about 1s. 6d., little is gained by coating the paper oneself. However, for the benefit of those who do not mind the trouble the following formula is given:—

A.	Ferric ammonium citrate (green)	100 grs.
	Citric acid	20 grs.
	Water	1 oz.
B.	Potassium ferricyanide	40 grs.
	Water	1 oz.

Mix in equal parts, bottle, keep in the dark, and filter before use. This solution will keep good for several weeks. A still more rapid printing paper may be obtained by increasing the quantity of citric acid to 30 grains.

The sensitiser is applied with a brush or sponge. The paper is printed until the shadows bronze, and is developed by washing in cold—preferably running—water.

Under-exposure.—There is no satisfactory remedy for this, although hot water is sometimes used.

Over-exposure.—This is an advantage, provided the negative is strong. Dissolve 20 grains of bichromate of potash in 20 ozs. of water and flood the print with it. A fine deep blue is obtained. The bichromate intensifies the print by what is generally known as partial substitution, and also clears the white portions of ground from the blue tinge.

Nearly all the large photo-printing firms put their blue-prints through the bichromate bath first, after which they are, of course, washed as usual.

Alterations or titles may be added in white lines on blue-prints by means of this solution,—Potass. oxalate, 75 grains per ounce.

The Ferro-Gallic Process.

This process is for line drawings. It gives a positive from a positive in ink-coloured lines on a dull white ground. It is essential that the paper to be coated is smooth and hard. The harder the better, as if the iron salts penetrate to the body of the paper no washing or any other treatment will get them out in development.

A formula for the coating is as follows:—

A.	Gum arabic	40 grs.
	Warm water	1 oz.
B.	Tartaric acid	20 grs.
	Ferric sulphate	40 grs.
	Ferric chloride	75 grs.
	Water	1 oz.

Mix the two solutions in equal parts. If kept in a cool, dark place it will keep for weeks.

The developer is alum and gallic acid, 1 part of each. Water 80 parts.

In cases of under-exposure the ground can be made much whiter by careful application of dilute sulphuric acid. It should be noted, however, that should any of this touch the image it is at once obliterated.

Ferro-Gallic Water-Bath Process.

The sensitiser for this paper seldom varies much from that of acid-bath gallic, which it really is. The only difference is that while with the latter we have the developer separate, in the water-bath method the developer is attached to the surface of the paper. This is effected by the simple process of rubbing the dry and finely powdered gallic acid evenly over the sensitive coating.

On a commercial scale it is done by a machine called a scrubber, the chief feature of which consists of two heavy irons padded with thick felt. These, by a circular motion, rub on the gallic acid while the paper is being wound through the scrubber on a revolving iron drum.

The machine is fed with acid through an aperture at the top, and to protect the health of the operator and, incidentally, to avoid damage to any coating solutions in the vicinity, the upper portion of the machine is enclosed by means of glass framing, so that the little clouds of acid thrown up by the scrubbing pads shall not escape.

For those who wish to "water-bath" their own paper at home a strip of felt nailed on to a wood support, or better still, a worn-out brush, will be found to provide a fairly serviceable scrubber.

In view of the fact that the light takes longer to penetrate the sensitive coating, owing, of course, to the layer of acid, water-bath paper generally requires about one-third more exposure than would be given in the case of acid bath.

The Sepia Process.

This gives a copy in white lines on a brown ground from an ordinary tracing. Sepia paper is chiefly used now in cases where the tracing is dirty or damaged, as it is obvious that all marks on the tracing will appear both on the negative and the subsequent positive unless "blocked out" on the negative by means of brown spirit dye.

When coating paper by the sepia method at home care should be taken to select a thin, pure, and fairly transparent raw paper. Obviously, the thinner the paper negative, the quicker can a positive be printed from it.

A formula for the sensitive coating is as follows:—

A.	Ferric ammonia citrate (green)	110 grs.
	Water	1 oz.
B.	Citric acid	10 grs.
	Water	1 oz.
C.	Silver nitrate	45 grs.
	Water	1 oz.
D.	Pure gum arabic	30 grs.
	Water	1 oz.

Equal parts, say 1 oz., of each of these solutions are mixed as follows:—D is rendered fluid on a water-bath, A and B added, and lastly C, a few drops at a time. The prints are fixed in 1:50 hypo and gain considerably more depth, a factor which should be allowed for.

The True-to-Scale Reproduction Process.

One of the chief difficulties which used to beset the photo-printer was shrinkage of prints during development. In cases where tracings had been made to scale and subsequent copies taken it was found that the latter shrank to such a degree as to render it impossible to work accurately from them. This difficulty was surmounted to a large extent by giving the exact figure for each individual measurement, a method which involved considerable expenditure of time.

Numerous experiments were made by shrinking raw paper prior to coating, but this only complicated the problem, for it was found that the coated paper when developed shrank again, sometimes with the grain and sometimes not.

It soon became obvious that the ideal method must be a dry process rendering shrinkage almost impossible, and allowing a varied number of prints to be taken from the single impression.

In view of the fact that True-to-Scale embraces both these advantages, it is not surprising that it speedily became the leading process for line work, though its unsuitability for tones must be admitted.

Chemically, the process depends on the well-known fact that ferricyanide of potassium plus ferrous sulphate in solution gives a blue precipitate.

A better idea of the actions involved can be gathered by following the process from the initial stage.

To commence with, the undermentioned coating composition should be made up:—1 lb. gelatine, 2 oz. ferrous sulphate, 1 oz. glycerine, 1 oz. orange chrome (in 5 oz. water), 40 oz. water.

Measure out 30 oz. of water in an enamelled vessel and allow the gelatine to soak for at least two hours. Powder the ferrous sulphate and dissolve it in half a pint of water. When the gelatine has become soft dissolve by gentle heat or on a water-bath. Add the sulphate solution slowly with constant stirring, likewise the solution of chrome, and lastly the glycerine. The chrome is used solely for colouring, the glycerine is to prevent the gelatine drying too quickly.

Remove the warm mixture from the water-bath and filter through cloth. Then flow the mixture evenly over a sheet of glass, zinc, or linoleum, and allow it to set properly.

The next item is to take a ferroprussiate print of the tracing from which copies are required. It should be slightly *over-exposed*. The print is not developed in any way, but taken straight from the printing-frame and placed face downwards in even contact with the coated surface for about one minute, then peeled off by pulling from one corner. If it sticks the gelatine is not set or else the print has been left in contact too long.

Presuming all is in order, it will be noticed that the ferric portions of the print have come away from it and have adhered to the gelatine. Also, the ferrous sulphate in the latter has reduced it to the ferrous state, hence the blue positive image which shows on the gelatine.

It will be found that this image (really insoluble prussian blue) dries the gelatine sufficiently to attract printers' ink if a roller is passed over the surface, while the other parts of the gelatine reject the ink.

By placing a piece of white paper over the inked impression a fine clear copy can be obtained of the original tracing. If the impression is inked each time before applying the paper as many as twenty-five or thirty copies may be obtained from one impression.

It is essential that the roller shall be well charged with a hard printer's ink on the first occasion it is applied, as this makes considerable difference if a number of copies are required.

CLEMENT PRISEMAN.

EYES AND NOSE IN PORTRAITURE.

To what extent the production of a pleasing portrait owes its existence to the photographer's recognition of apparently trifling irregularities in the subject's features is a point which perhaps is often overlooked by the less experienced portraitist. It may, therefore, be of service if we find space for some notes from "American Photography" on this subject, in which the want of symmetry between eyes and the two sides of the nose is the theme of Mr. Arthur Hammond, a portrait photographer whose work is of a high order, and who in this article deals with the expedients which may be used in the case of many a sitter whose eyes and nose are perceptibly unsymmetrical.—Eds. "B.J."

THERE are very few people who have absolutely level eyes, or whose eyes are exactly similar in size and shape. Some one has said (was it Ruskin?) that this is "one of the peculiar instances in which nature insists on variety even where uniformity would seem proper." Sometimes the difference is quite noticeable, and sometimes only very slight.

This is one of the reasons why people often insist that one side of the face photographs better than the other, and a photographer should look out for this, and should know what to do.

Almost invariably, when the eyes are unequal in size or unlevel, it is the larger or the higher eye that has the better expression, and that is the one that should be prominent in the photograph. In discussing irregularities of the features and the methods of dealing with them, we have in mind portraits in which the head is a fairly large size, such as a head and shoulders portrait on a 7 x 5 plate. In full-length pictures of a smaller size the head and face are usually so small that such things as the unlevel eyes are not apparent.

By photographing a three-quarter view of the face with the higher or larger eye nearer the camera, the effect of lowness or smallness in the further eye will be minimised. The smaller or lower eye will appear to be quite natural, for there will be a feeling that the smallness or lowness is the natural result of perspective, and on a casual inspection of the print the difference will be scarcely noticed. As a matter of fact, of course, as one eye is not more than an inch or two further away from the other, the actual diminishing effect of perspective is so minute as to be quite inappreciable; but yet, even if the further eye is in the print noticeably smaller or lower, the thought of the perspective satisfies the mind of the most critical observer, and the difference in size is not at all irritating.

In a profile portrait, where only one eye is seen, it is easy, if the eyes are very unequal, to choose the side showing the better eye and let that be the one to appear on the picture.

It is good practice to observe the eyes of people one meets during the day, on the streets or in the cars, and it will help the photographer in enabling him to make up his mind quickly as to which is the better side of the face, quickness of perception being obtained only by long practice.

It is, after all, essential, both from the artistic and from the materialistic point of view, that a portrait should be as pleasing a picture as possible, and it is quite within the operator's power to make a flattering portrait that is at the same time a good likeness, simply by being careful to bring out as strongly as possible all the good points in the sitter's face.

This is quite a different thing from flattery in its grossest form, namely, flattery by retouching, when often the shape of the features is altogether changed and true likeness destroyed. That kind of thing is unnecessary and inartistic. It is quite permissible, however, and, in fact, it is the duty of every photographer to idealise his sitters by accentuating the good points, and by neglecting to emphasise the defects in the face.

The eye is not the only feature that is likely to be irregular. Very often the nose is slightly crooked, and leans a little towards one side or the other.

In order to prevent this crookedness from showing too prominently, it is best to photograph the face with the nose leaning away from the camera, that is to say, if you imagine that the nose has been pushed over to one side, the best side of the face to photograph is the side from which the nose has been pushed. This applies to a three-quarter view of the face or a profile. If the crookedness is very noticeable, a full face picture should be avoided.

There is a question that may occur to the logical and observant reader; suppose the eyes and the nose do not agree, suppose the eyes demand that the face be photographed from one side while, according to the rule for the nose, the opposite side is the one to select? This is a difficulty that may occur, though, fortunately, in nine cases out of ten, it will be found that the eyes and the nose go together, but, of course, the photographer, like the man who always carries an umbrella, must be prepared for the unexpected.

A face in which the eyes slope one way and the nose another is very unsatisfactory to photograph, and whichever side is chosen, there will always be some irregularity which can only be avoided by photographing the face in profile according to the rule for the nose, or by selecting the point of view that is best for the eyes, and then straightening the nose a little by retouching.

There is another point that must always be considered in making portraits and that is the tendency to get slight distortion of the features by selecting an unsuitable point of view. In this respect, the height of the camera is a matter that should be considered, for it is wonderful how easily a face can be put out of drawing by the lens being too high or too low. This again applies to large heads rather than to small full-length pictures. A high view point tends to shorten the neck, it accentuates the upper part of the face and shows more of the hair, it lengthens the nose and raises the shoulders, whereas, on the other hand, if the camera is low it makes the neck appear longer, it enlarges the mouth and chin, shortens the nose and forehead, and lessens the amount of hair visible. This last is an important point when photographing a man who is growing bald!

The best height for the camera, as a rule, is with the lens level with the chin.

It will be obvious that by means of such slight changes in the drawing of the face, the photographer has at his disposal a valuable means of correcting or neglecting to emphasize irregularities of the features, that is to say, if a sitter has, for instance, a large mouth, it will help matters a little to raise the camera, thus emphasising the upper part of the face rather than the lower part, and in the same way a nose inclined to be too short may be made to appear as long as possible. The same effects may be obtained by regulating the pose of the head. If the head is tilted forward a little, the effect will be much the same as if the camera were lowered. This is another point that must be considered, and the personal characteristics of the sitter must be taken into consideration. It would not be natural for a gentleman with a fine Roman nose to be photographed with the head tilted forward; being of a commanding personality, he would be more likely to keep his head well up, in which position a naturally long nose would not be unduly lengthened. On the other hand, a young lady with a slightly "retroussé" nose might well be taken with the head slightly tilted down, which would tend to lengthen her nose. If she were photographed with her chin in the air, she would in all probability be dissatisfied with the pictures. In the case of a sitter with a prominent nose and a short upper lip, it is important to keep the chin well up and the camera low, otherwise the nose may completely cover the lip.

All these apparent alterations of shape and size of the features, foreshortening and distortion, are much more noticeable when a short focus lens is used and the camera has to be placed rather near the sitter. When using a long focus lens, the ideal lens for portraiture, slight changes in the height of the camera do not make so much difference, but, even then, it is advisable to observe these rules.

If the amateur when making portrait studies will pay some attention to these points, he will find that his pictures will be more likely to please both himself and his exacting models, for it is incumbent on every photographer to try and make every picture as pleasing as possible, and if he can succeed to some extent in accentuating the good points in a face and making slight defects and irregularities less prominent, he will have accomplished a great deal.

Arthur Hammond.

Goole War Memorial.—The memorial to local officers and men of the Mercantile Marine, which has been the subject of a demonstration in consequence of it containing a picture produced by the Berlin Photographic Company, has had in place of the picture the Red Ensign of the Mercantile Marine painted in.

The Testing of Scientific Glass-Ware.—In response to requests from the Ministry of Munitions and the Department of Scientific and Industrial Research, and in conjunction with the British Chemical Ware Manufacturers' Association and the British Laboratory Ware Association, arrangements have been made, with the aid of the Ministry of Munitions for testing graduated glass-ware at the National Physical Laboratory on a larger scale than has hitherto been possible. The conditions of test, and scale of charges, are given in the Test Pamphlet of the Metrology (Glass Testing) Department, copies of which may be obtained on application to the Director, The National Physical Laboratory, Teddington, Middlesex, and marked "Metrology (Glass Testing) Department."

Tribunal Appeals.—In the First Court of the Birmingham Local Tribunal at the Council House, Mr. G. Jones presiding, Mr. Willison applied for exemption on behalf of a district manager of a photographic business. It was explained that he supervised eight of the twenty shops belonging to the firm, situated at Birmingham, Manchester, Leeds, Nottingham, Leicester, Cardiff, Bristol, and Sheffield. He had to make constant journeys between these places. The firm did a great deal of work for passport purposes, and supplied cheap photographs for soldiers' wives. The turnover was a very large one.

In answer to the National Service Representative, applicant, who is forty-five, and passed Grade 2, said that he understood photography.

The National Service Representative thereupon pointed out that photography was of the highest importance in the Army, and such a man would be extremely useful.

The application was refused, with the proviso that the applicant should not be called up before August 31.

THE EARLY WORK OF HURTER AND DRIFFIELD.

(The first Hurter and Driffield Memorial Lecture delivered by Mr. W. B. Ferguson at the Royal Photographic Society on May 14.)

The subject of my lecture to-night will be that part of the early work of Hurter and Driffield, done in the fourteen years before the publication of their classic paper in 1890, which led them to the discovery of their famous law which expresses the relationship between exposure, development, and density.

The study of the Hurter and Driffield manuscripts has been to me for the last two years a fascinating pursuit, and I have found many things there hitherto unpublished in which I have every hope I may interest you to-night.

Biographical.

I should like first to give you some personal details about the two men in whose honour this Hurter and Driffield Memorial Lecture has been founded by your Society.

Vero C. Driffield.

Ferdinand Hurter was a Swiss, born on March 15, 1844, at the delightful old town of Schaffhausen, in Switzerland. He was the only son of Alderman Tobias Hurter, a famous artistic bookbinder of that place.

In the gymnasium, or higher school, of his native town, under Professor Merklein, he began the study of chemistry, for which he at once showed great interest and liking, and was found to have a more than ordinary ability for mathematics.

At the age of sixteen he was apprenticed to a dyer at Winterthur, and three years later he got an appointment with Messrs. Seelig, silk dyers, of Zurich.

While there he was struck by the unscientific methods employed in the business, and he felt the need of a greater knowledge of chemistry than he had then obtained. After consultation with his former teacher at the Schaffhausen gymnasium, his parents consented to his continuing the study of chemistry at the Zurich Polytechnic under Professor Städeler. In this he showed such ability that at the end of the course Professor Städeler wrote to his step-father suggesting that the young Hurter should be sent to Heidelberg for further scientific study, with a view of taking his degree there.

After some consideration this was arranged, and in the autumn of 1865 Ferdinand Hurter went to Heidelberg, where he studied under those giants of science, Bunsen, Kirchhoff, and Helmholz, and in 1866 took his degree of Ph.D., with the highest honours—"Summa cum Laude."

At the early age of twenty-two he was offered a Professorship at Aarau, but he refused this, and decided, fortunately for us, that England offered the best opportunity for the employment of his talents. In the spring of 1867, with a few letters of introduction, he came to Manchester, but for some months was unable to obtain employment. However, he heard that Gaskell, Deacon, and Co., of Widnes, required an assistant chemist. He had an interview with Mr. Deacon, who engaged him for a month on trial. Here he remained, first as an assistant and shortly afterwards as chief chemist, till the works were absorbed in the business of the United Alkali Co., in 1890. He was then appointed chief chemist and technical adviser to that company, a position which he held until his death on March 5, 1898.

He thus spent the last thirty-one years of his life in England. Apart from his professional work he was much interested in the welfare and progress of education in this country, and took a considerable part in the political movement in favour of Free Education for the people.

Ferdinand Hurter.

Though Swiss by birth, he was at heart and in all his views a most thorough Englishman.

Vero Charles Driffield, the son of a Lancashire coroner, was born on May 7, 1848, at Prescott, in Lancashire. He received his earlier education at the Liverpool Collegiate Schools and at Sandbach Grammar School, but later on attended the private school at Southport kept by a Swiss, Dr. Knecht, to whom he was indebted for his earliest scientific training, and he considered the time he spent under his Swiss master as the most important part of his early education.

At an early age he had become interested in the practice of photography, and though intended for the profession of an engineer he was allowed to spend half of his seventeenth year in the studio of Henry Sampson, of Southport, a well-known photographer whose name often appears in the earlier numbers of our "Journal." Here he learnt all that was known at that day of the principles and practice of photography.

On the completion of his engineering studies and apprenticeship, he entered the employment of Gaskell, Deacon, and Co., the Widnes Alkali Manufacturers, and with them, first as engineer and then as general manager, he remained until his death on November 14, 1915.

Actinometry.

In 1871, then, the two men were associated in the employment of Gaskell and Deacons, and were both passionately fond of music; and it was this that first brought them together, and no doubt the training which Driffield had received from his Swiss teacher, Knecht, rendered more easy a mutual understanding between the two men, which before long ripened into a firm and intimate friendship for life.

Driffield, who had for some years been keenly interested in photography, continued to devote much of his leisure time to that subject, and it will be well to consider the state of photography at that time.

The collodion plate was practically the only sensitive medium at the disposal of the photographer, gelatino-bromide plates were not yet invented, the construction of exposure tables had not been heard of, and such things as F. numbers were still unknown. (D.N.—L., p. 4.)*

Little was understood of the principles governing exposure, and even less of those relating to development. The whole practice of the art was governed by "rule of thumb." It was a hit or miss business, and as Driffield remarks in one of his paper, "We were most familiar with the results of under- or over-exposure; those of correct exposure were few and far between."

In 1876 (D.M.S.—No. 12) Driffield induced Dr. Hurter to take up photography as a recreation, but to a mind accustomed to methods of scientific precision the uncertainties and happy-go-lucky methods of photography were intolerable. No photographer could adequately allow for the daily and hourly fluctuation of the light with any certainty of a proper exposure, the best he could do was to make a more or less well-founded guess: it was clear to Dr. Hurter that such a matter as exposure must be governed by a law of nature, and with a view, therefore, of reducing exposure to a system, and generally with the object of rendering photography a quantitative science, the two men agreed to devote their leisure time to making a joint investigation of the subject. ("The Actinograph," 1889.)

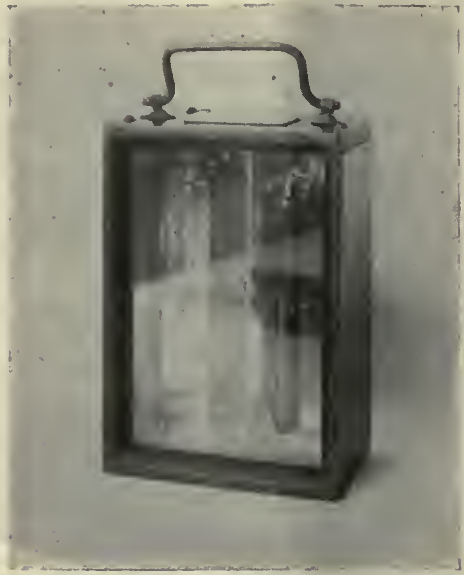

Fig. 1.

The first point was the estimation of correct exposure. The plate must be exposed to suit the light, and—as details are wanted in the shadows which are illuminated by the diffused light only—some means had to be devised for the accurate measurement of the actinic power of diffused daylight. (D.MS.—No. 12, p. 2.)

Bunsen and Roscoe had already made experiments on the measurement of the actinic power of daylight, but the methods employed by them were not convenient or, indeed, possible for photographic practice. Certain experiments on which Dr. Hurter had been engaged with nitric oxide led him to the conclusion that when light is absorbed by a coloured substance its energy must do some molecular work, and if there is no change in chemical composition there must result a rise in temperature. (J.S.C.I., April 30, 1890.)

Experiments made with a differential gas thermometer containing nitric oxide confirmed this view, and actinometers on this principle were made in various forms, and a patent was taken out in April, 1881, for an instrument of this kind.

A later and improved form of the instrument is one in which one bulb was of thin flashed copper ruby glass and the other of similar white glass; the bulbs contained air and aqueous vapour, the indicating syphon gauge between the two being filled with a solution of iodine in potassium iodide and carbonate.

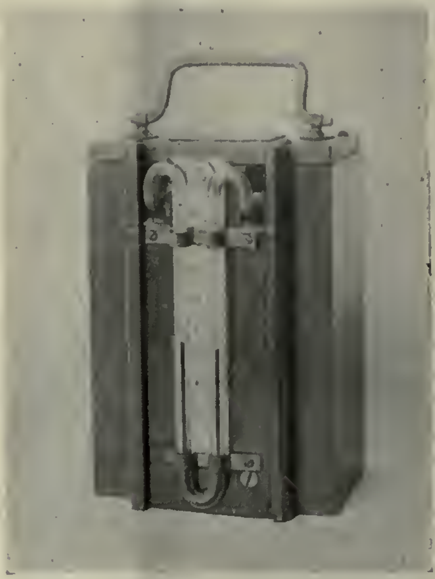

Fig. 2.

Dr. Hurter's own instrument, still in working order, is shown on the table (figs. 1 and 2).

The maximum diffused daylight causes a rise of about 80 mm. on the scale.

Later on (H.MS.—No. 1) actinometers were constructed to obtain automatic records from hour to hour on strips of bromide paper by photographing continuously the image of the indicating column showing from moment to moment the variation in diffused daylight as affected by the altitude of the sun and the conditions of the atmosphere. Such a record is now shown (fig. 3).

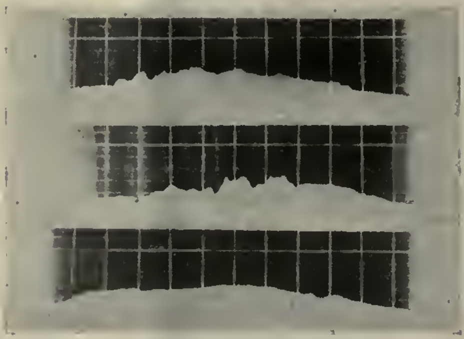

Fig. 3.

From the study of these records, taken every day of the year 1885-1886, two things became evident: First, that the fluctuations of light from a certain mean were such that the highest light was never more than double, and the lowest serviceable light was seldom less than half this mean value—that is, that variations in exposure from 1 to 4 were sufficient to meet alterations in the light due to varying atmospheric conditions. Secondly, it was recognised that the diffused light was proportional to the sine of the altitude of the sun, thus confirming the view of Bunsen and Roscoe, who had shown the illumination of the atmosphere to be a function of the cosine of the zenith distance of the sun.

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* The references throughout the paper are as follows:—H.N.—A, B, etc., indicates Dr. Hurter's Notebooks; D.N.—A, B, etc., indicates Mr. Driffield's Notebooks; H.MSS. 1, 2, etc., indicates Dr. Hurter's Manuscripts; D.MSS. 1, 2, etc., indicates Mr. Driffield's Manuscripts. These notebooks and manuscripts, with the historic apparatus used in the H. and D. researches, are in the Royal Photographic Society's House. J.S.C.I. indicates *The Journal of the Society of Chemical Industry.*

Dr. Hurter, in a lengthy investigation (H.N.—F.) from an astronomico-geometrical point of view, arrived at the same conclusion on theoretical grounds, and complete light and latitude tables (H.N.—G., H.N.—H., D.N.—K.) were calculated from astronomical data.

Photographic exposures were made in accordance with the indication of their actinometer for a number of years, and the results were such as to leave no doubt as to its capacity for the accurate measurement of diffused daylight.

While these researches were being made the gelatino-bromide plate invented by Maddox in 1871 had been placed on the market by Burgess, of Peckham, J. W. Swan, and Wratten and Wainwright. The great variety of speeds in the new plates indicated strongly the importance of discovering some method of numerically expressing the speed value, and with this in view Hurter and Driffield began a series of investigations in order to ascertain the law which expresses the action of light on the sensitive plate in the camera. (D.MS.—No. 12, pp. 5-6.)

The intensity of diffused daylight being measurable, the next step was to ascertain what amount of this light would pass through a lens and fall upon the plate in the camera. The Notebooks (H.N.—A., pp. 1-14) show that measurements were made of the focal length, effective value of diaphragm, losses of light by reflection at surface of the lens, and many other details which affect the illumination of the image, with a view of obtaining a numerical expression of what Dr. Hurter calls the "Slowness" or "Inertia" of the lens.

If F = focal length of lens;
  d = effective aperture of diaphragm;
  K = a coefficient indicating what fraction of incident light passes through a single lens and n the number of lenses in the combination, then:—

$$\text{S (slowness or inertia of lens)} = \frac{1}{K^n}\left(\frac{F}{d}\right)^2$$

and on this formula the inertia of the lens could be numerically expressed.

As an example (H.N.—A., p. 26) in the case of a Ross Landscape Single Lens:

F =	11·895 cm.	K =	0·827
d =	0·58 cm.	n =	1

$$S = \frac{1}{0{\cdot}827} \times \left(\frac{11{\cdot}895}{0{\cdot}58}\right)^2$$

$$S = \frac{(20{\cdot}51)^2}{0{\cdot}827} = 508{\cdot}5$$

The speed or quickness of various lenses was, of course, inversely as their slowness or inertia.

Inertia.

The next point was to inquire into the action of light on the sensitive surface, to measure and express numerically the inertia, or its inverse the speed of the plate, and this is so important a matter in these researches that I should like to quote in full from Dr. Hurter's Notebook the first mention and definition of the idea of "inertia" as applied to a plate.

"Suppose," he says (H.N.—A., p. 15), "that a light of intensity 1 acting directly upon a plate needed a time t to so far alter a bromide of silver gelatine film that an impenetrable black deposit of silver was caused upon it on development, then the plate would be the more sensitive the shorter the time t could be made, and a plate would be called slower the greater the time t is; and if the time t were very great, and still did not affect the plate, then the plate would be called insensitive or *inert*.

"That time t, therefore, measures *the inertia of the plate*, and when ascertained by suitable experiment would yield a coefficient of inertia."

For details, reference should be made to H.MS.—No. 9, but the conclusion arrived at is:

If I = intensity of light expressed in actinometer degrees;
  t = time of exposure in seconds;
  S = the slowness of the lens;
  i = the inertia of the plate;

then in the case of a properly exposed negative—

$$\frac{I \times t}{S} = i \text{ (inertia of plate)}$$

and

$$\frac{S \times i}{I} = t \text{ (time of exposure)}$$

As I, t, and S are capable of direct numerical expression, it is clearly possible from a satisfactory negative to calculate a number which shall express the inertia of a given plate; and, secondly, to calculate the time of exposure necessary with any lens (whose S has been measured) to give a properly exposed negative with a plate whose inertia has already been ascertained.

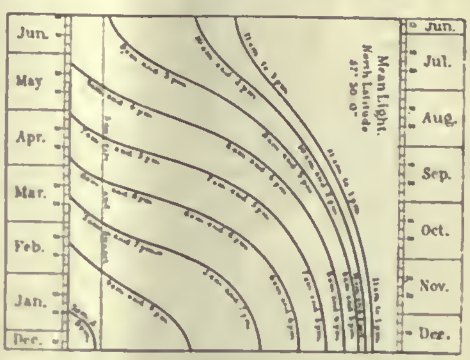


Fig. 4.

An example from their Notebooks (H.N.—A., p. 107, No. VI.) may make the method more clear: Using a "Globe" lens with the largest stop, the S number worked out as shown above being 487, it was found that when the actinometer registered 17 deg. a good negative was obtained on a Wratten slow plate by an exposure of 6 seconds.

Then $\frac{17 \times 6}{487} = 0{\cdot}209$ is the inertia of this plate.

This means that a sky (density 2) would be obtained by exposing the plate directly to the sky for 0.209 seconds when the actinometer registers 1 deg. (H.MS., No. 9).

If we now require to know what exposure we must give, using this plate, when the light measures 15 deg., using a lens with a small stop, the S value of which is 2133, we have:

$$t \quad \frac{2133 \times 0{\cdot}209}{15} = 29{\cdot}7 \text{ seconds.}$$

This, then, was the camera method of numerically indicating the inertia of a plate, and in 1886 and 1887 many of the new gelatino-bromide plates then appearing were tested in this way. It was found that the calculation of the inertia and proper exposure took up more of the leisure time of the experimenters than could well be spared, and about March, 1887, in Dr. Hurter's Notebook (H.N.—A., p. 121) he writes: "To avoid everlasting calculations we made a slide-rule which answers very well."

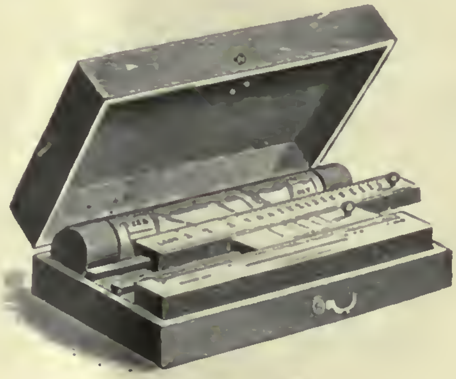


Fig. 5.

With the rule, set degrees of light to lens figures, then opposite the inertia is the exposure. The actual rules are now in the possession of the Royal Photographic Society.

This slide-rule was the first idea of their "Actinograph: an instrument for the calculation of photographic exposures," which was patented in 1888.

From the light and latitude tables previously referred to, diagrams were made graphically representing for any given latitude the average relative intensity of the light through every hour of each day in the year (fig. 4).

Logarithmic scales were constructed which, when applied to these diagrams and properly adjusted, showed at a glance the necessary exposure with a particular lens and stop for a plate of given inertia. The inertia scale was later replaced by a scale of actinograph speeds, and the instrument was placed on the market first by the inventors and later by Marion and Co. (fig. 5).

As it could be used to calculate not only the exposure, but also from a properly exposed negative the inertia or speed of the plate used, it came into considerable use among the photographers of the time.

W. B. Ferguson, K.C., M.A.

(To be continued.)

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

An Alternative to Vignettes and Blocking-out.

It sometimes happens that a photograph shows the background more conspicuously than is desired. In such cases first thoughts are usually in the direction of vignetting or painting out, but there are occasions when neither of these remedies suit the subject. Some pictures prove very difficult to vignette, and painting out in certain cases may leave a very skimpy sort of picture behind.

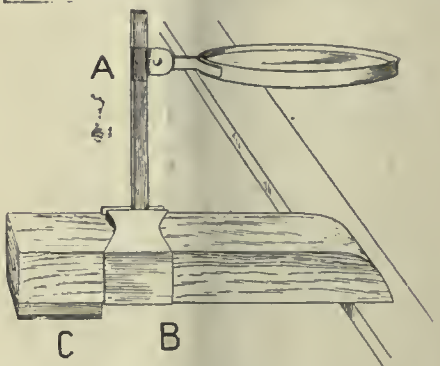
A very useful dodge is to "fade" the unimportant parts of a picture by covering the glass side of the negative with either matt varnish or tissue paper, and then knifing away the parts of the covering which are directly above the important parts of the photograph. With subjects containing straight lines—machines, buildings, etc.—the varnish is the best, but when the tissue can be used some fine effects are obtainable. To fasten it down, the negative should be laid on a clean sheet of paper, glass side up. An even layer of photo paste is spread on to it, and a piece of dry tissue carefully laid down and pressed into contact. When bone dry the knifing can be done. The parts left covered will assume in the print a very distant plane, and while serving to complete the composition of the picture will not compete with the main points of interest. Local touches with an oily pledget of cotton wool will bring forward any parts that are "faded" too far.—Thermit.

Some Aids in Blocking-out Negatives.

Few people indeed can block out a negative well freehand, that is by means of brush and colour alone, though many try to do so. This is especially the case with commercial subjects containing straight lines or long curved ones. Very fine detail, too, calls for special care, especially if the negative is to be enlarged. The following hints will enable almost anyone to equal the best work in quality, if not in speed.

A negative to be blocked out should not be touched on the film side, as finger-marks prevent the colour from taking properly, and it is just as well to go over it with ox-gall before starting work. In many cases a pencil line is a great help in defining an outline where the brush is to be used afterwards, and except where outlines are quite sharp and clear it is well to coat the film with retouching medium and start outlining with a soft lead, No. 2 or B.B., using a ruler as guide for straight lines and a French curve to help in the case of other details. Even if the straight lines are ever so short, it is surprising how much better the finished print looks if a ruler has been used, especially if some of these lines are parallel to one another.

A useful little device for holding a small magnifier to a ruler for very exact work is sold by Griffins under the name of "Third Hand." By working under a magnifying-glass it becomes easier to work small details, and the finished effect is improved. The idea consists solely of a bit of wood about two inches long and about half-an-inch square, section-glued and screwed in the middle of a short ruler at right angles. A bit of thick card or three-ply is fixed under the free end to the same thickness as the ruler itself, and finally a tiny bit of cloth or chamois-leather is stuck under each end of the ruler and of the tailpiece also. The object of this is to raise the ruler off the film and so avoid scratching and smearing as one moves the ruler from one part to another, as it then touches the film at the three points only where the cloth is. The centre of the magnifier is kept by means of this dodge always over the edge of the ruler, and is much more convenient than holding it on the thumb, as recommended by the makers. It is steadier, for another thing, and also is kept with the axis of the lens at right-angles with the negative, which avoids reflections and a lot of eye-strain. A means for adjusting the distance of the glass from the negative is provided in the instrument itself. The ruler is held by the left hand, and the pencil or ruling-pen, as the case may be, in the right, and the lens is always just where it is wanted.



A. Third-hand magnifier. B. Bit of 3-ply to balance ruler. C. Chamois leather to prevent scratching.

For still finer work a jeweller's eye-piece can be used. There is a good deal of strain in the continuous use of such a glass, and I do not recommend it except for specially small detail. A lot of the strain comes on the eye which is not in use, and to avoid this a sheet of black or brown paper with a small hole for just the portion being worked is placed under the negative. There is then no need to close the other eye. Having to wear spectacles, I soon found that it was better to use the eye-piece in combination with the glasses I wear than to employ it alone, and at first attached the eye-piece with a rubber band, but afterwards made a clip of a bit of spring-wire which has a loop once round the body of the magnifier and a little hook on each side by which it is slipped on and off as required, hooking on the side of the bridge and the ear-piece of my spectacles. One little improvement to the eye-piece is to make a few holes in the body for ventilation, so that the glass will not steam in cold weather. With the other magnifier it is best to sit back so that both eyes are equally employed.

It is advisable in any case to work in a warm room, so that the colour will dry fairly quickly as it is laid on. This is especially the case when working on varnished negatives, and on these it is often difficult to obtain a dense or even coating. A thin coat of gelatine solution allowed to dry will overcome this. If a negative must be varnished before blocking out, or for putting extra work on, it is a good plan to thoroughly desiccate the plate and allow it to cool before flowing on the varnish, when it will "chill" and give a slightly matt surface instead of the usual highly glossy one, and will take both pencil and colour better. When the varnish is seen to dull it is best to dry off by heat just as in the usual way.—D. Charles.

Strengthening Aerograph-Tubing.

THE small white tubing supplied by the Aerograph Company is nice and light to handle when attached to the Aerograph headpiece; but, after a while, by continuous pressure from within, it gradually gives way, swells, and eventually bursts at the ends near the headpiece and air tank, which is a drawback when good pressure is preferred. A very good and cheap remedy for this is to obtain a yard or so, according to the length of the tubing to be covered, of ordinary tape, wide enough to fold round the tube, and stitched down. The width for stitching down should be gauged beforehand and the tubing drawn through afterwards, bringing the covering of tape right up over the nozzle of the headpiece with the tubing and tied down with it. Rubber connections have been covered in this manner for over twelve months without having any trouble, whereas before the tubing was continually being renewed, and, as I use high pressure, it is not only a saving, but the trouble caused by continually taking off the tubing to cut off the burst portions is considerable.—GEORGE COLEMAN.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SATURDAY, JULY 20.

South London Photographic Society. Excursion to the Zoo.
Hanley Photographic Society. Outing to Hanchurch and Beech.
Manchester Amateur Photographic Society. Outing to Peover Hall and Church.
Hackney Photographic Society. Outing to Lord's Bushes.

TUESDAY, JULY 23.

Hackney Photographic Society. "Home Portraiture." S. Woodhouse.

CROYDON CAMERA CLUB.

THE secretary, Mr. Sellors, is up to his old tricks again with announcements for lectures. The title given by him for last week's paper was "First Steps to Progress," by Mr. G. W. Moore, which aroused expectation of something of the Bunyan order, stimulating to the morals, something, perchance, which even a bromoilist, or the "Walrus" might find salvation in; but the title was a snare and a delusion, for the "first steps" applied only to our blessed ancestors who lived in caves in ages too remote for agreeable contemplation.

Mr. Moore knows his topic well, and, as the ancestors were unavoidably absent, he would have experienced a walk-over on every point raised had not some of their virile descendants vigorously contested many propositions stated. The subject is one of extreme interest, and the lecturer handled it most ably and learnedly in his paper, and with this bare acknowledgment it must be left, as however primitive contributions to a photographic journal may be, objection is raised to prehistoric ones.

In the discussion Mr. Ackroyd executed really superb stunts over large areas, ably supported by the Rev. Le Warne, who cast doubts on theories raised relative to the evolution of man, and certainly from an ecclesiastical point of view they were open to considerable improvement. The "office boy" soared on the wings of an idea that the first important advance was due to the discovery of alcohol, and for want of support crashed badly. Mr. Keane opened in fine style, but in the act of adding something in parenthesis entirely forgot his original theme, and fizzled out, to the regret of all. On the origin of the use of fire so many experts spoke as to create an impression that a jump had been made from the prehistoric to the hereafter. Mr. Reynolds was of opinion that the thought of what we owe our ancestors should engender a feeling of humility—quite a nice idea, but difficult to apply, for instance, in a case of hereditary gout.

The Chairman, Mr. Claypoole, in proposing a vote of thanks for a capital evening, recommended all who wished to further study the subject to read "The Bowl Girl." For this week's meeting the club's notice board reads "The President on Steam." Odds were offered with no takers that the absent "flu" patient will be found to be on nothing of the sort.

News and Notes.

PHOTOGRAPHY AND DEFENCE OF THE REALM.—At Bridlington, Hilda Seaman, a visitor, was fined ten shillings for taking photographs of some children on the sands.

HOLIDAY CLOSING AT LONDONDERRY.—Four out of five photographers in the city of Londonderry are advertising in the local newspaper their intention to close for holidays from August 5 to August 10 inclusive, and invite the public to place their orders at once to save disappointment.

NEW PATENTS POLICY.—The Board of Trade on Monday last issued the following notice:—"Payments to and on behalf of 'enemies' in respect of Patents, Design, and Trade Marks.

"The Board of Trade hereby give notice that they have revoked the general licences of December 7, 1915, and September 5, 1917, under which, subject to certain conditions, the payment was permitted of fees, etc., due in enemy countries in respect of the grant, registration, or renewal of Patents, Designs, and Trade Marks, and also the payment in his Majesty's Dominions and Allied Territory on behalf of enemies of similar fees, etc., in respect of such industrial property. All such payments are consequently prohibited in future."

EXEMPTION WITHDRAWN.—The National Service Representative brought up for review the conditional certificate granted on April 21, 1917, to Stanley S. Harrison, 38 (Grade 2), Westgate Street, Bath, photographer, formerly C 3. A condition of exemption was that he enrolled as a National Service Volunteer. He did so, and was told to be ready in fourteen days, as he was prepared to undertake aeroplane work. "And I have been waiting ever since," he added.—The Chairman said photographers were badly wanted in the Army.—Captain Mawer: Not to take soldiers and girls, but photographs of Germans from above.—Respondent: I only want time.—Captain Mawer: A time exposure, you mean. Exemption withdrawn; not to be available till August 13.

THE INDUSTRIAL RECONSTRUCTION COUNCIL.—An important series of lectures is announced by the Industrial Reconstruction Council for the autumn and winter. The first of these will be given by the President of the Board of Trade on Wednesday, October 2, Mr. G. N. Barnes, M.P., occupying the chair. Other lectures will follow at fortnightly intervals, the second being delivered by the Minister of Reconstruction under the chairmanship of the Lord Mayor. Mr. W. L. Hichens, Sir Arthur Steel-Maitland, Bart., M.P., Mr. Ernest J. P. Benn, and Sir William S. McCormick, will carry the series up to Christmas, the chair being occupied by Sir Wilfrid Stokes, Lord Burnham, Mr. J. H. Whitley, M.P., and the Marquess of Salisbury. The lectures will be held at the Saddlers' Hall, Cheapside, at 4.30 p.m. A full prospectus of the series can be obtained from the Secretary, I.R.C., 2 and 4, Tudor Street, E.C.4.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

* *We do not undertake responsibility for the opinions expressed by our correspondents.*

SENSITOMETRY OF PHOTOGRAPHIC INTENSIFICATION.

To the Editors.

Gentlemen,—I apologise to Messrs. Nietz and Huse for not having acknowledged sooner their courtesy in acceding to my suggestion in the "B.J." of April 6, 1917, that they should make an investigation of the action of different intensifiers, including the method with iodide of mercury and Schlippe's salt. It is satisfactory to find in their article in "B.J." of April 19 last that this intensifier comes out so well in their tables, but a difficulty arises as to its adoption, since I was informed at Messrs. Hopkin and Williams' that Schlippe's salt is not now to be had.

There is another intensifying method, which I have introduced at two studios where it has been in use with success for some little time, requiring nothing but what is in common use, and of which I propose shortly to send you working details.—Yours faithfully,

W. E. DEBENHAM.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

A. B.—There is no method for intensifying sulphide-toned bromide enlargements.

Diffusing Medium.—We should advise tracing cloth for the diffuser which will cut off much less light than cotton nainsook and is quite sufficiently good as a diffuser for half-watt lamps

Soft-Focus Lens.—We do not think you can do better than get a Dallmeyer patent portrait lens—say, a 3a; with this you can regulate the diffusion. If you require still further softness, try using the front lens alone.

Portrait Lens.—The lens is of the portrait type and would answer for cabinets or better still for postcards in a short studio. Since it is probably fifty years old we cannot give you any idea as to the original price. If you want to use stops, you can cut them out of black card and put them in the hood nearly touching the front lens.

Casket Lenses.—The casket sets are very useful for outdoor work, as affording a series of focal lengths, but are useless in the studio owing to the small working aperture. Usually the biggest aperture of the set is not more than about f/5, whilst the longer focal lengths are correspondingly slower. We should say the value of a set is from £1 to 30s., as these sets have never been popular.

Concave.—Imitation miniatures are made by facing the prints in sheets with thin celluloid, afterwards cutting them into discs and mounting in rims. For appliances for celluloid facing, rims, etc., apply to Messrs. J. Fallowfield, 146, Charing Cross Road, W.C.2. The thin celluloid, also cement, is a speciality of Messrs. H. Rheinlander and Son, Rodney Road, New Malden, Surrey.

Grey Spots.—Will you kindly tell me the cause of the greyish spots on prints. They are developed in azol and fixed in alum-hypo, and then without rinsing are toned in alum-hypo. We have large batches spoiled by grey spots.—Land Crab.

The trouble is a very common one, it is due to the prints being put into the fixer and left for a minute or two with air bubbles beneath, hence these spots get longer development.

Inquirer.—We have never heard of a process corresponding with your description. Apparently it is some kind of Bromoil applied to metal, for which purpose apparently it would be necessary to have the metal coated with bromide emulsion after a suitable substratum had been applied. We should very much doubt whether you could employ the Kodak Transferotype paper for the same purpose. But it would be easy enough for you to try.

Copyright.—Will you kindly register for me the copyright in the enclosed four photographs, and let me know the charge for doing so, when I will remit?—Jabez Thomas.

As we have many times pointed out, there is now no necessity to register photographs; in fact, registration as a formality in connection with the legal establishment of copyright is abolished. The copyright is now automatically created by the making of the work under certain conditions. You should get the shilling book on "Photographic Copyright," supplied by our own publishers, price 1s. 2d., post free.

Markings on Postcards.—We find it difficult to account for the scummy markings on the postcard, particularly as you do not tell us anything of the treatment the cards have received—whether passed through an alum bath or a fixing-hardening bath. Markings of this kind are liable to be produced in hot weather, but the best we can say is that you should refer the matter to the makers, sending them, say, half a dozen examples of the defect, together with a dozen sheets of unexposed cards from the same lot.

Opening Branch Business.—1. Yes. A licence is necessary if you wish to establish or carry on a new branch of a business at premises not previously used for such business by yourself. 2. You should make application in writing to the Director of National Service, New Arts Building, Liverpool University, Liverpool, that being the nearest regional headquarters for Lancashire. General particulars, such as the length of time you have been in business and reasons for wishing to extend such business, will be sufficient.

Blisters on Bromides.—It is difficult to give a reason for the blistering. We have used a quantity of this brand of paper in all sizes and have had no trouble. You do not say whether the bubbles are large or small; if the former, they may be due to slight breakages on the paper base caused by kinks in handling; change of temperature also as an important bearing on blistering. If your developer is much warmer than the washing water, or vice versa, it may cause blistering; freshly used hypo is generally much colder than the washing water and this may cause the trouble. Send us a sample of the blistered prints if you have further difficulty.

Electric Light in Enlarging.—I cannot focus the light in my enlarger, now using an electric light 200 power bulb, without getting coloured rays. I used to use an incandescent gas mantle, and could quite easily get a white light, any size, enlargement or reduction. It is a half plate condenser.—A. G. F.

The smallness of the illuminant and its great intensity find out the weak points in the optical system of the lantern. Condensers as used for enlarging are very inferior as regards both glass and workmanship, and will not stand the ordeal of a point of light. If you interpose one or more pieces of ground glass between the arc and condenser the trouble will disappear.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

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Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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SUMMARY.

While, as we are glad to note, the practice of placing the portrait centrally upon the mount, with a consequent "dropped" appearance, has almost disappeared, those making a speciality of portraits of tall, narrow shape should note that the margin of mount above the print should be distinctly greater than that at the sides; that below may be greater still. (P. 333.)

In a further article dealing with methods of single-solution sepia toning which have been the subject of experiment we refer to one employing selenium, and to a number of others in most of which, apparently, the toning action is produced partly by a polysulphide, either purposely produced or existing as an impurity in the toning material. (P. 334.)

The second portion of the Hurter and Driffield Memorial Lecture, in which an original sketch of Dr. Hurter's first special photometer is given, with other illustrations of subsequent models, appears on page 339.

We refer to an instance which recently came before us where a photographer made advantageous use of the primitive fixed-focus box type of enlarger for the purpose of turning out quickly, in quantity, and by comparatively unskilled labour, enlargements from commercial negatives. (P. 333.)

In a talk to receptionists which we reprint from "Camera Craft," Mr. William Westman touches upon a few points of tact and courtesy essential to the good saleswoman. (P. 337.)

A short memoir of the late Mr. F. C. Beach, formerly Editor of the American "Amateur Photographer," and the inventor of the well-known Beach's developer, appears on page 343.

In many studios roller stands for backgrounds are still in use. Mr. Morris Levy urges their abolition and suggests a series of backgrounds which has the merit of simplicity in use and arrangement. Where saving of space is a consideration, these suggestions will be of some service. (P. 336.)

A direction in which the older school of skilled photographers may launch out after the war is indicated in "Meeting a Change" on page 334.

A letter dealing with the use of ferro-prussiate paper for printing from ordinary negatives will be found on page 343.

A short article on the working strength of amidol, pointing out the differences in quality of image and directions in which economy of amidol may be effected, will be found under "Assistants' Notes," on page 341.

At the last council meeting of the Professional Photographers' Association several matters of importance were discussed, notably those concerning sittings for the National Portrait Gallery and recruiting of photographers for the Royal Air Force. (P. 342.)

Lens matters, developing dishes, and postcard printing are among the subjects dealt with in "Answers to Correspondents," on page 344.

EX CATHEDRA.

Fixed Focus Enlarging Boxes. It is no disparagement of the elaborate forms of enlarging camera or lantern which a professional uses to point out the special usefulness of the most primitive pattern of enlarger, viz., the fixed focus box, popular with the tyro in the making of enlargements. We had occasion the other day to note the inclusion of quite a battery of this pattern of apparatus in the equipment of a professional worker, one of whose characteristics is his readiness to adopt methods which are out of the ordinary. The appliances were of the plainest description, simply boxes about 13 × 11 inches internal sectional measurement and about 30 inches in length, fitted at one end with holders for a quarter- or half-plate negative, and at the other with a light-tight pressure frame for paper up to 12 × 10 inches in size. An R.R. lens mounted on a panel between the two gave a degree of enlargement of about 2; that is to say, an 8½ × 6½ "print" from a quarter-plate negative. It transpired that a fair proportion of our friend's outdoor work was done on quarter- or half-plates, and that the negatives were then turned over to assistants for "printing" in these boxes upon slow gaslight paper, the work being thus got out quickly without the attention of the principal, which would have been needed had enlarging been done in the ordinary manner. In other circumstances than such as these a system of this kind has its own advantages, for example, in obtaining quickly the best enlargements from customers' poor negatives by making use of slow long-range gaslight paper of the "New Kodura" type. In a busy establishment there is, then, no objection to the fairly long exposures required as there would be in using an ordinary enlarger; nor, in the alternative, any necessity to employ a high-power light-source such as an arc.

* * *

Placing the Narrow Portrait. We are glad to find that within the past few years both photographers and mount-makers have come round to see that a print needs to be placed a little above the geometrical centre of a mount if it is to avoid a dropped appearance. Exceptions to this good rule may still be noted, but, thanks to the mount-makers, who are practically the masters of the situation, they are very rare. But in the case of a portrait of narrow panel shape it is necessary, for the best effect, to observe a rule which we still see disregarded in many mounted specimens. It is that the space of mount above the print should be distinctly greater in width than the side margins. Let the reader cut out a little panel portrait measuring, say, 3¾ × 1½ inches, and place it in a mount measuring 5¼ × 2¾ inches. The width of each side margin will thus be a shade over half an inch. With a top margin of just over ⅝ inch the effect is good, but it is only necessary to reduce the depth of this upper margin to half an inch or less in order to observe the unpleasant effect, as though a piece of the top margin had been cut off by mistake. As in the case of prints of normal proportions, it is difficult to say why there is anything in these conventional rules, but it is only necessary to spend half an hour with two or three prints and some pieces of mounting board in order to perceive that their observance is decidedly to the benefit of the whole effect of the mounted print.

* * *

Meeting a Change. When the present abnormal conditions come to an end, and there is no longer an influx of "khaki" sitters, photographers must be prepared for many changes in the general run of things. There has been a great accession of female workers in all grades, and it is quite likely that they will retain the positions which they have so efficiently filled for the last few years. Portrait photography is an occupation in which an artistically-minded woman is thoroughly at home, and now that manufacturers have made the purely technical part so simple, there is little that calls for the superior scientific knowledge or physical endurance of the "stronger sex." In face of this competition it would seem advisable for the old-established photographer who finds that portrait work is a diminishing quantity to turn his manipulative experience and scientific knowledge in another direction, and to take up the technical and commercial work which will be greatly in demand during the coming period of readjustment of our manufactures and trade. The first thing to be done is to find out what class of photograph is likely to be required in the district to be operated in, and the next to prepare a set or sets of good specimen pictures. Armed with these the manufacturers and dealers who require illustrations may be approached with some chance of success. One point must not be overlooked: the photographer must create the demand as well as satisfy it. It is of little avail to ask if photographs are wanted; it must be assumed and asserted that they are wanted, that they are indispensable, and that the photographer is at hand to supply them. Another field worthy of more attention than it usually receives is that of outdoor and "at home" work. In many districts photographers have been so indifferent to this that they have allowed London firms to sweep the country under their very noses, and to take substantial orders which might have been theirs for the asking. This is a field which will not be invaded by the ladies—there is too much hard work about it—and the technical knowledge necessary to carry it out successfully is not likely to be acquired by the present generation. So far, we believe that values and orthochromatics are sealed books to the lady operator, whose artistic qualities are usually her greatest asset.

* * *

Magic Prints. We are sometimes asked for details of the process by which prints may be rendered invisible on the paper and at the same time brought into a condition in which the picture gradually reappears on exposure to light. This is a variation of the old magic photograph of Herschel, which consisted of an ordinary print rendered invisible by bleaching with mercury bichloride and brought to full vigour again by damping with a piece of blotting paper soaked in either ordinary hypo or a solution of ammonia. For the bleaching of prints which are intended to become visible again by exposure to light about the best bleacher is a solution of chlorine water, obtainable from any large firm of chemists, and to be used where there is ample ventilation on account of its irritating vapour. The bleached prints are washed for a few minutes to get rid of the excess of chlorine, and are then sensitised by immersion in a weak solution (about 1 per cent.) of potassium nitrite. They are allowed to dry, without washing, in the dark, and will regain a fair measure of their original vigour by exposure to ordinary daylight. Generally the item on which there is some difficulty in making these magic prints is that of rendering the image completely invisible. This presents the greatest difficulty in the case of a white paper, and therefore the hint may be given that the use of one or other of the toned or tinted papers will make it easier to obtain a completely invisible image.

SINGLE-SOLUTION SEPIA TONING: VIEWS AND REVIEWS.

II.

In the preceding article we referred to the methods which have been brought forward during the past few years for sepia toning by a modification of the hypo-alum method, consisting in principle in the conversion of the silver image into a form in which it is more readily acted upon by sulphide; the converting substance and the sulphide (or a generator of it) being contained in the one solution. Other, and later, attempts at the problem of single-solution sepia toning have been of a different and more miscellaneous description.

One of these is a solution of selenium in sodium sulphide, placed upon the market some seven or eight years ago by a German firm. According to an analysis by Valenta (B.J. Almanac, 1913, p. 661), a toning solution of this kind is made by dissolving 10 gms. of selenium in 600 ccs. of a 20 per cent. solution of sodium sulphide. A toning bath of this kind, according to its degree of dilution, converts black bromide or gaslight prints in a shorter or longer time to a brown to purple-brown colour, at the same time tinting the high-lights orange. The orange tint is removed by means of a weak bath of acid sulphite. Apparently the toning action of this selenium-sulphide bath consists in a partial sulphiding of the silver image coupled with deposition of a red form of selenium upon the image. Valenta likewise found that the toning action is hastened by addition of a little pyrocatechin to the toning bath, this mixture yielding a sepia brown tone in a few minutes and a very agreeable purple brown print on longer action. So far as concerns the plain bath, that is to say the solution of selenium in sodium sulphide, our own recollection of its use is that it is slow in action, and though it can be used in the cold we doubt whether it is any more expeditious in use than hot hypo-alum.

Liver of sulphur is an impure form of potassium sulphide which has figured a good deal as a substitute for hypo-alum and with very various reports by experimenters as to its value and reliability. Inasmuch as the "liver" is a complex mixture of a number of substances, including polysulphide compounds, and as one sample is pretty certain to vary considerably in the amount and character of these impurities, it is not to be wondered at that experiences with "liver" as a toning agent are conflicting. It is sometimes said that liver of sulphur as a toning bath suits one paper and not another, but in the absence of any comprehensive series of tests with the same sample of "liver" on different brands of paper we think it is more likely that the cause of the difference resides in the varying quality of the "liver" itself. Practically the only contribution towards rendering "liver" more suitable as a cold single-solution toning bath, apart from various formulæ differing from each other only to a minor degree, is that embodied in a patent of E. Fenske (B.J. Almanac, 1914, p. 660), according to which the "liver" is mixed with a considerable quantity of hypo. The proportions recommended are 120 grs. of liver of sulphur dissolved in 15 ozs. of water, to which is added one fluid ounce of a saturated solution of hypo, and then water to make 20 ozs. in all. A toning bath compounded in this way provides, as we were able to observe for ourselves at the time, a comparatively speedy method of securing a considerable range of tones, from sepia to purplish brown. At the same time it suffers from the defect of any "liver" formula, namely, the impossibility of reproducing precisely the same toning action when using supplies of the crude sulphide from different sources. Nevertheless, the process is deserving of notice as showing that there is probably a mixture of potassium sulphide, hypo, and some other compound which forms a satisfactory cold sepia toning bath. It may be conjectured that the other compound in this mixture is one or other of the polysulphides which exist as impurities in the commercial "liver."

A method of single-solution sepia toning which confirms this interpretation of the action of liver of sulphur is that published by M. J. Desalme in 1913 (B.J. Almanac, 1914, p. 661). The method consisted in forming sodium bisulphide or trisulphide by boiling a highly concentrated solution of soda sulphide with the requisite quantity of sulphur, afterwards greatly diluting the yellow solution thus formed. It was found that in this cold bath prints obtained a warm sepia brown tone in about thirty minutes, and that the bath exhibited a very even action. An alternative method of forming the bisulphide or trisulphide (or more probably a mixture of both) in solution which was recommended by M. Desalme consisted in adding hydrogen peroxide to 5 per cent. solution of soda sulphide. The yellow solution thus produced formed a toning bath which acted more rapidly than that obtained by forming the polysulphide by the method already mentioned.

An interesting investigation of a process of direct sulphur toning was described some years ago by MM. Lumière and Seyewetz (B.J. Almanac, 1914, p. 660). Its principle consisted in mixing hypo and acid in presence of some colloid substance through which the sulphur is retained in a very fine state of division, providing that the proportions of hypo, colloid, and acid are correctly chosen. The proportions found best by Lumière and Seyewetz were hypo, 125 gms.; dextrine solution (50 per cent.), 250 ccs.; water, 1,000 ccs.; to which was added shortly before toning 50 ccs. of hydrochloric acid. The curious part of this process is that prints on bromide or gaslight paper undergo no apparent alteration in the toning bath, but after immersion in it for twenty or twenty-five minutes, on subsequent washing in water, gradually change their tone to one which closely resembles that obtained with hypo-alum. MM. Lumière's firm placed a mixture of this kind upon the market, replacing the hydrochloric acid by sodium bisulphate. While they emphasised its production in the cold of brown tones similar to those secured with hot hypo-alum, it would seem that the process was never used at all generally either in this country or in France. Some short time after this publication a somewhat similar method, but dispensing with the use of a colloid substance, was published by Mr. H. Soar (B.J. Almanac, 1914, p. 662). It consisted in immersing prints for about twenty or thirty minutes in a cold bath containing hypo, ½ oz.; water, 20 ozs.; sulphuric acid, strong, 20 minims. As in the Lumière method, prints undergo no apparent change in the bath, but develop the sepia tone on washing in water. Mr. Soar in his paper referred to the readier toning of the prints by heating the bath to about 90° F., and to the shortening of the time of after-washing by addition of various substances, such as potassium permanganate, chloride of ammonium, to the acid-hypo mixture. In the case of the use of the bath at a temperature of about 90° F. it was found that prints reached a warm brown tone in about ten minutes. These results of Mr. Soar's were confirmed by MM. Lumière in a later paper, in which it was pointed out that the colloid material could be dispensed with and the toning effect obtained by transferring the prints saturated with hypo from the fixing bath to a weak (1 per cent.) solution of hydrochloric acid, in which they were allowed to remain for from thirty to forty minutes at 60° F. In this process also the sepia tone is not obtained until prints are subsequently washed. The suggestion to use a hypo bath to which acid has been deliberately added in fair quantity will naturally appear a thoroughly retrograde step to those who have been taught to regard acidity of the fixing solution (unless protected by sulphite) as one of the most certain causes of impermanence in prints, and so it is when prints are being fixed. On the other hand, if prints have been completely fixed in a plain hypo bath or a properly compounded acid-fixing bath, the harmful effect of the acid-hypo mixture is not likely to make itself evident. At the same time we should hesitate to recommend the procedure, advocated in somewhat different forms, both by MM. Lumière and Mr. Soar, of transferring prints direct from the fixing bath to the acid solution; on the grounds of safety it would be preferable first to ensure complete fixation, and second to wash the prints free from all soluble silver compounds.

Lastly, to bring this review of these methods to an end, mention should be made of a further toning process published by Kropf (B.J. Almanac, 1914, p. 664), in which the toning mixture consists of equal parts of 10 per cent. solutions of arsenic acid, potassium bichromate, and citric acid, one part of the mixture being diluted with four times its bulk of water. In this highly poisonous solution bromide prints were found to tone, in the cold, to a sepia brown colour in from twenty to thirty minutes, the silver image apparently being converted into one of silver arsenide. From the practical standpoint the method has very slight interest, but it is deserving of notice as suggesting the possibility of sepia processes by which the silver image is converted into a compound other than sulphide.

Autotype Retouching Leads.—The Autotype Company are now supplying British made leads of excellent quality, which fit the ordinary holders, in four grades, ranging from B to HH. They are packed in neat boxes of the pre-war pattern, containing half a dozen in each, at 10d., or 1s. post free. With these and the well-known Autotype mediums the retoucher will have no reason to complain of war shortage as far as he is concerned.

Tribunal Appeals.—At Canterbury the National Service representative appealed against the temporary exemption given to Frank Bailey, 45, Grade 1, married, photographer. The grounds of the appeal were that the man was Grade 1, that his business was of no national importance, and consequently that there was no reason why he should not serve his country. Mr. Shea urged that this was a one-man business which could not be carried on by his wife, and that great hardship would be entailed if Bailey were called up. Respondent stated that he took from six to twelve photographs a day for people who required them for permits to visit prohibited areas. The N.S.R.'s appeal was allowed, Bailey not to be called up until September 24.

At Carlisle Mr. T. H. Mawson, solicitor, supported the appeal of George R. G. Morton, photographer, aged 46, Grade 1, a widower, with one child, who carries on business under the name of Morton George. This was, urged Mr. Mawson, simply and purely a one-man business which the regulations intended to protect. It would be a great hardship if he had to go, because his business would have to close down. The appeal was dismissed, the man not to be called up till August 12.

BACKGROUND SERVICE.

The old system of fixing the backgrounds on stand-rollers and other similar contrivances should be abolished. My chief reason for this decision is that nearly all backgrounds, which may be included in the categories of interiors, exteriors, scenic, and the many types of the conservatory description, can be dispensed with. The above remarks should carry conviction when one ponders on the large number of clients who demand either the plain white background or, in many cases, a portrait study showing a dark background. Curiously enough this general demand is in evidence in middle or lower class studios, as well as in the studios which only the "upper ten" patronise. Taking this fact into consideration, I wish to point out that in many studios not only could a certain amount of useful space be saved, but also that a judicious arrangement of backgrounds makes for speed in working the latter—and, what is of equal importance, the comfort of the worker. The method in practice not so long ago should be altered to suit up-to-date requirements. I will now endeavour to explain how a minimum of expenditure and trouble will secure a maximum of variety in the use of backgrounds, as well as the greatest rapidity in their manipulation. The length of the studio is of little consequence here, save that in short or cramped studios the saving of space effected will be all the more appreciated.

A Background for Sketch Work.

Taking an average of about 13 ft. in breadth, I propose first to deal with the sketch background. This decidedly requires careful consideration owing to the immense popularity of sketch portraiture. For subjects representing moderate-sized groups an 8-ft. ground would be ample, but nowadays orders frequently come in for large groups, and it would be as well to be prepared for such. This, of course, calls for a continuation of the ground at both sides. Should one be fortunate in possessing a canvas or old ground of the required breadth, it can easily be converted into a most useful background for all sketch work. It should be stretched on to the back frame of the studio, or attached to the back wall by means of strips of wood running down the wall, about 2 ft. apart. A great advantage will be gained by having just about 10 ft. of the canvas flush against the wall or support. The $1\frac{1}{2}$ ft. of canvas at both ends should be brought forward a little in "wing" fashion, as in Fig. 1. All operators are aware that the corners of the studio are not so well lit as the central part of the ground. Therefore the advantage referred to will at once be recognised. Assuming that an 8-ft. canvas is the only one available for sketch work, then another old ground ought to be cut in two halves and attached by stitching a part at both ends of the background. In either case when fixed into position as above noted, the background must first get a thorough sponging to remove the dirt. Should it be very dirty it will be advisable first to sponge it with a weak solution of carbonate of soda. A final rub down with a rubber sponge saturated in warm, clean water will be necessary. The canvas is now permitted to dry, and it is then painted over with one or two coats of Hall's sanitary distemper.

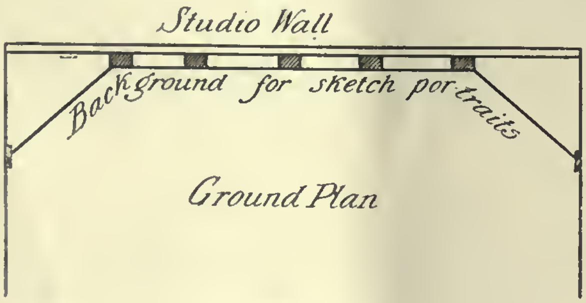

Fig. 1.

In many studios the operator is seriously handicapped in sketch work by being forced to take large groups against an 8-ft. background. As a direct result of this the figures have to be placed too closely together. This difficulty is more evident when the group is to be taken full length. The operator is still more at a disadvantage when he is expected to use a half-plate where the order is for 8 x 6 or larger. The forced study of economy in plates, in view of the highly increased cost, will make the use of too narrow a background a matter of extreme inconvenience. In these circumstances the side figures will often be on the extreme edge of the plate, and vignetting or "sketching" will prove to be a source of worry and difficulty to the printing and finishing staff. When a large group has to be taken the operator is forced to improvise some substitute for continuing the background, which is not often satisfactory. It will be patent, then, that by using a background of full width, not only will much time be saved, but also a considerable amount of vexatious trouble and annoyance.

The Dark Background.

It will be noted that, so far as the sketch ground is concerned, practically little space has been taken up, and I may suggest that it may be advisable in some cases to alter the lighting arrangements to suit the altered system. We have now to reckon with the dark ground. This is also a most useful accessory and is used for a variety of purposes. A few pounds spent on this will amply repay the initial outlay. It is always false economy to provide a cheap substitute for an accessory that is expected to be much in use. This background or "curtain," to be exact, should be fixed about 10 ins. in front of the white ground. The best and quickest method is to hang it on a rod, so that it may be "whisked" away to the side wall. In reality, for convenience of working, two half-curtains will be needed. Twenty-two yards of black velveteen will be required. This material should be 30 ins. wide, and will be found to be very serviceable. The cloth should be cut into eight equal lengths and handed to a machinist to stitch together. Whoever is entrusted with this work should be advised to make two curtains—that is, four pieces to each, so that they will form two curtains 10 ft. by 8 ft. A caution should be added that the "pile" must always run upwards. This precaution will prevent excessive reflection of light upon the folds. If carefully ironed at the back, the seams will not be visible. One-inch brass curtain rings should now be sewn on the top about every 15 ins., so that the curtains may run or slide freely on the rod. A $\frac{5}{8}$-in. brass rod, about half an inch less than the width of the back of the studio, should be procured and placed into its position at the top, so that it will provide a sliding bar for the free movement of the curtains. This rod should be supported at both ends by a block of wood fixed to the side walls. Two pieces of wood about 2 ins. thick will be required. The length does not matter, about 6 ins. being ample. A "V" should be cut out of the top of each, and they will be ready for fixing on to the side walls, as in Fig. 2. By adopting this method the curtains can be put up or taken down without any loss of time, although this will not be required except occasionally for cleaning purposes. A half-curtain is kept at both sides, and when a full group has to be posed both curtains are brought into use, when a fold will hide the join at the centre. As there will be plenty of fulness, a tug here and there at several parts will cause a series of folds that will provide a very pleasing background, suitable for many artistic studies. For a bust, three-quarter length, or even a small group, one of the curtains pulled into the middle would suffice, as it gives a ground of 10 ft. without the folds.

Rembrandt Effects.

It will be obvious, of course, to the portraitist that the position of the curtain background will not be suitable for Rembrandt effects. This popular style of portrait necessitates the use of a background fixed on to a stand that runs with castors. As a general rule this is at best a clumsy and unsightly object in a studio, and as it takes up considerable space, always seems to be in the way. In penning these lines my primary object is to save as much space as possible, and the problem is further overcome by dispensing with the use of the stand-supported background, and substituting one on the roller principle. This is accomplished by adopting the following plan :—First, place the existing stand into its usual position when in use for Rembrandt heads. A sitter is now carefully focussed, and the supported background moved about until a pleasing and satisfactory result in lighting is observed on the focussing screen. The position is marked on the roof or floor exactly equivalent to the top or bottom of the stand. The latter is now removed, and any tradesman will fix up at very little cost a pair of arms to support both ends of the roller. A piece of dark cloth is fixed on this roller by the same method as ordinary backgrounds, and it will work up or down by means of the cords in the same way.

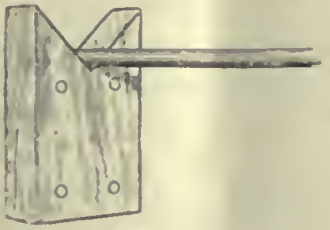

Fig. 2.

A Plea for Firelight Studies.

I would strongly urge those who have not already done so to introduce that style of portraiture known as the firelight study. Instruct a tradesman to make a simple fireplace with mantelshelf complete. This should be made of light material, so that it may easily be lifted to the side when not in use. It certainly should not be made of large proportions, but if too heavy for the assistant to lift, four castors will remove that little difficulty. A carpet footstool and a skin or ordinary rug complete all the accessories required. Many beautiful studies can be secured by using the above. When a firelight negative is retouched a splash of any opaque water-colour on the glass side above the grate bars lends the realistic effect of flames leaping up the chimney flue. The black curtain makes an admirable background for these studies. The prints should, of course, be stained with the "Vanguard" firolight stain or orange dye. A very pleasing effect is also obtained by first toning sepia and then re-toning with the salt-sulphocyanide-gold chloride process, which gives that fine red-chalk tint. This latter process does not stain the whites, but, to my mind, I do not think this a serious disadvantage. A family group should be neatly arranged in cosy, homelike fashion. None of the group should be looking towards the camera. In fact, no operator will find any difficulty in posing a group for a specimen picture. A fairly full exposure, lit from one side only, gives the most satisfactory results. A glance at Fig. 3 will show approximately an arrangement for experiment. A carefully finished enlargement, say about 15 x 12, will prove to be one of the best business "pullers" in the window or showcase.

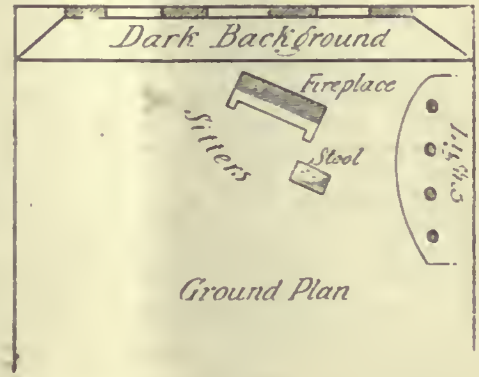

Fig. 3.

We have now secured a series of backgrounds with which we are enabled to cope satisfactorily with large groups in sketch or other styles without any fuss or bother. Add to this the fact that we have only used up about 12 inches of space, and the great advantage gained will at once be realised. As there will be ample space left in front of the velveteen curtains a few other backgrounds of the scenic variety can be fixed up for emergency use on the ordinary roller principle. A plain light linoleum makes a most serviceable and lasting foreground for sketch and most other work. Finally, a length of dark felt about 8 ft. by 5 should be provided. This makes a capital foreground for full lengths and groups to be taken against the dark curtains. This felt is kept rolled up at the side wall when not in use.

MORRIS LEVY.

FOR THE RECEPTIONIST.

[While there is nothing essentially new in the advice contained in the following notes which we reprint from our San Francisco contemporary, "Camera Craft," the points which are raised include matters which need to be included in the mental equipment of the receptionist who takes a pride in her occupation. Perhaps in no other kind of salesmanship is a similar degree of tact called for, and this in respect to widely different subjects. Mr. Westman has some good counsel to give, and his notes will repay careful reading.—EDS. "B. J."]

THE receptionist should always bear in mind that her least tone or action has its effect upon the customer, who, coming in as a stranger, is particularly susceptible to suggestions. If she has to fumble about and pull over piles of samples in order to find the one desired, the impression is that visitors are few and far between, and the few that do come in do not cause so much trouble in being waited upon. The samples most frequently shown should be nearest at hand, and all of them so arranged that any one wanted can be at once located. She should remember that, despite the fact that these samples have passed before her own eyes a great number of times, they are, no doubt, quite new to the particular customer in hand, and she, the receptionist, must put enthusiasm for them into her talk and actions. And above all things, the samples must not be allowed to become soiled, and, of course, they should not be tossed about as if they were something of no value. The customer is not to be blamed for taking a low estimation of the value of the pictures if the suggestion is made by the ill-treatment of them by the people who are responsible for their production. Learn to handle the samples carefully with the fingers just engaging the edges, much as you would a very sensitive emulsion coated plate.

Except when the customer states, right on the start, the amount she wants to pay, one should bring forward something that is just a little better than the usual run of work, following this up with something just a little better still, taking care to explain clearly why this last is better. Showing the most expensive styles first leads to an awkward position if a customer should ask if something better is not available, as they frequently do. Even if the customer tells you just what price she wants to pay, and even if that be the price of a very good quality, a little better grade should be shown, but it should be put forward without any effort to influence the customer or belittle the amount she has mentioned as her limit of expenditure. If this is not done, the customer will sometimes find fault later and blame the studio for not having shown her these better goods, which that are really more to her liking, even at the higher price. When this last happens one has no good defence to offer, as it is hardly good policy to explain that one failed to show the better goods because the price was too high for the customer. When these better specimens are shown, it is well to bring forth something of a lower grade, as the comparison will be to the advantage of those first shown, not infrequently resulting in the selection of the better quality.

Above all, never ask the customer, "About what price?" It is unfair, to say the least, both to the customer and the goods you are trying to sell. The customer is rarely looking for pictures at a certain predetermined price. What she does desire is the largest possible amount of gratification of her individual taste in the matter of pictures at the price most nearly in accordance with such gratification. What she wants is value for her money, and that value is not expressed in square inches of surface, amount of embellishment in the way of a mount or folder, or any other tangible quality. It is a value varying with the customer, perhaps a value created in the customer's mind by having the difference between the several grades of work explained to her, preferably with a due consideration of her individual tastes in the matter. This last can generally be easily and quickly determined by observing how the first few samples are received. If the customer gives only a casual glance and shows no interest, at once put that sample aside and show something else, taking a hint from the lack of interest shown and avoid showing similar pictures.

Always arrange matters so that the pictures can be shown to the customer in a good light, and, if conditions will permit, arrange so that the samples can be taken to one side and the customer made comfortable, much as one would seat a friend in a suitable chair and good light before giving him a portfolio of fine prints to enjoy. Asking the customer to stand at a counter or walk about from rack to cabinet savours too much of the grocery and the department store, and while talking to the customer do not allow of any interruptions, do not allow your attention to be diverted. If you must answer the telephone or give some other matter your care, do it as quickly and quietly as you can, asking the customer to excuse you before going, and perhaps apologising for the interruption as you return. Give the visitor, who is "just looking around" all the care and attention you can; and, no matter how trying the customer may be, keep your temper, keep pleasant. Frequently the visitor is fresh from some store or other place where she has been treated in an overbearing way, and, on coming to you, adopts an aggressive manner as a matter of defence. If not, if her trying manner is quite natural, she is to be pitied, and the receptionist has no excuse for allowing the customer's vexatious manner to influence her own.

And above all, do not talk too much and do not show too many samples or styles. Doing either of these things confuses the customer who may later be dissatisfied with her selection made under pressure of this kind. Let the customer do all the talking she will on the subject of pictures, to the end that her likes and dislikes may be disclosed. Watch closely and the number of samples that can have no possible interest for the particular customer in hand will be found to be surprisingly large. When a sample is shown simply to emphasise the good quality of a better or more desirable size, do not leave it about, but immediately it has served its purpose put it aside and out of the way.

And under no pressure of suggestion or appeal allow yourself to run down the work of another studio. The customer may appear to be influenced, for the moment, by such talk, but there is always a reaction that is unfavourable. There is, perhaps, no line in which it is less idle to make invidious comparisons. A portrait by the best photographer in a town may not suit the particular customer as well as one made but a few days later by one whose average work is quite mediocre. The customer's taste may not be such as to assure an appreciation of the best work, and even if that is not the case, the customer may have been in a more propitious mood on one occasion than on the other. All that your particular studio can undertake to do is to make its best efforts towards pleasing every customer by giving of its best skill and its fullest application of the facilities at its disposal. If that skill and those facilities excel, the likelihood of the finished pictures doing the same is, of course, increased. But it is hardy advisable to emphasise even that point, except as it may be suggested in the behaviour of the receptionist as her acquaintanceship with the customer unfolds.

It would hardly seem necessary to advise against showing styles that are no longer turned out, or mounts that are not stocked in sufficient quantity to fill the customer's orders, yet these last two errors are being committed every day. Know just what mounts are on hand and know exactly what style of pictures are adapted to them. Also know the price of every possible combination of mount, print, and finish that is at all consistent. If a certain style of picture is wanted, and the studio is not prepared to turn it out, explain just why it is no longer offered and show the customer something that is better value and more pleasing for the same price. Never question the customer's taste by referring to something wanted as being out of style, no longer in demand, or anything like that. The better explanation is that the style wanted has been superseded by something that is better value as fitting in better with the regular output.

WILLIAM WESTMAN.

PROHIBITED CANADIAN IMPORTS.—It is announced in the "Board of Trade Journal" that by an Order in Council of June 3, 1918, from the Colonial Office, the list of restricted imports into Canada includes photographs, paintings, drawings, blue prints, and picture and photograph frames of any material, except under licence, to be obtained from the Minister of Customs upon the recommendation of the War Trade Board.

MESSRS. RAJAR, LIMITED, MOBBERLEY, announce that their works and offices will be closed from Saturday noon, August 3, until August 12 for the annual holidays and general overhaul of plant and machinery. The closing is necessary owing to the factory working day and night, and, when working, there is no time for various alterations and replacements.

THE EARLY WORK OF HURTER AND DRIFFIELD.

(The first Hurter and Driffield Memorial Lecture delivered by Mr. W. B. Ferguson at the Royal Photographic Society on May 14.)

(*Continued from page* 330.)

Density, Opacity, and Transparency.

During the ten years which had passed since Hurter and Driffield began their photographic researches the introduction of the gelatino-bromide plate had caused a complete revolution in photography, and much work in addition to what has been indicated above had been done in various directions. Attention had been turned to the new methods of development proper to the new plates, and many experiments had been made on the changes in the time of appearance of the image due to variations in the quantities of pyro, bromide and ammonia contained in the developer. But as development was the subject of much more advanced researches in later years, I do not propose to enter into details of their early work in this direction.

It became evident to our two workers that the field open to inquiry was vastly greater than that which they had considered at the beginning of their work, and that to make satisfactory progress it would be necessary to devise more refined methods of research.

It will be remembered that the correctness of the camera method of speed determination depended on the obtaining of a satisfactory negative, i.e., one which would give a satisfactory print. They now proceeded to inquire what were the physical properties of such a negative, and it became necessary to consider the laws of absorption of light by opaque black bodies such as reduced silver, and to define the terms transparency, opacity, and density, and to explain their numerical relations to each other.

To make their views on these points clear to you, I show a plate of glass divided into strips: one strip is clear glass, the next is covered with one thickness of developed film, the next with two thicknesses, the next with three, and so on, marked 0, 1, 2, 3, 4, etc. (Fig. 6). You will see that strip 0 allows practically all the light to pass through; that strip 1 stops some of the light: in this particular case it lets 1-3rd the light come through; that is, if light of unit intensity falls on one side, 1-3rd is transmitted, and we say its transparency is 1-3rd and its opacity we define as the inverse of this and call it 3. In order to transmit light of unit intensity, we must let the incident light be three times as much.

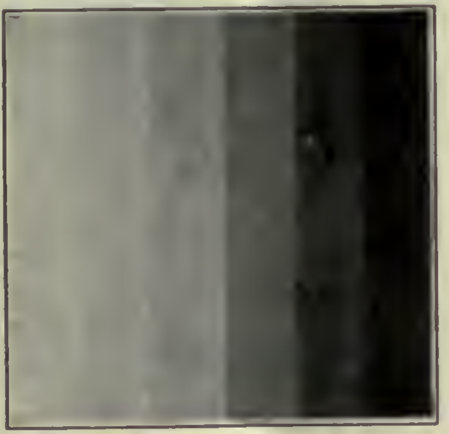

Fig. 6.

Opacity, then, is the number representing the amount of light which must fall on a plate in order that light of intensity 1 may come through.

Now consider the third band, where there are *two* strips of film. Here 1-3rd of 1-3rd or (1-3rd)^2 or 1-9th will be transmitted and the opacity will be 6.

In the next strip the light transmitted will be 1-3rd of 1-3rd of 1-3rd or (1-3rd)^3 or 1-27th, and the opacity 27.

Now the next diagram will show these figures arranged in their proper order, so that we can consider them and their relation one to another.

Light of Intensity 1.

No. of Films	0.	1.	2.	3.	...... N.
Transparency	$\frac{1}{1}$	$\left(\frac{1}{3}\right)^1$	$\left(\frac{1}{3}\right)^2$	$\left(\frac{1}{3}\right)^3$	...$\left(\frac{1}{3}\right)^n$
Transparency	$\frac{1}{1}$	$\frac{1}{3}$	$\frac{1}{9}$	$\frac{1}{27}$	$\frac{1}{(3)^n}$
Opacity	1	3	9	27	$(3)^n$
Density....................	0	·477	·954	1·43	—

The first line gives the number of films from 0, 1, 2, 3, to N.

The second line shows the *transparency* expressed as powers of the fraction which is the transparency of one film.

The third line shows these multiplied out, and

The fourth line the inverse of these, or the *opacity*.

Now any number such as 3, 9, 27, etc., may be expressed as some other number raised to a power and the index of the power is called the logarithm of the first number.

Thus the opacity 27 is $(3)^3$ and 3 is said to be the logarithm of 27 to the base 3.

So you will see that in this way the number of films may be considered as the logarithms of the opacities to the base 3, but in ordinary use we have logarithms to the base 10, and I write in the last line the logarithms of the opacities to the base 10 and these are what Hurter and Driffield call the *densities*.

As the amount of silver light-stopping stuff in each band is proportional to the number of films, we see that the densities are proportional to the amount of silver in the film or films, and if instead of having 1, 2, 3, or *n* separate films we had 1 film with bands containing 1, 2, 3, or *n* times as much silver, the result would be the same.

Density, then, is defined (H.N.—B., p. 1) as the logarithm of the opacity; as the logarithm of the number indicating the intensity of the light which must fall upon the plate in order that light of intensity 1 may be transmitted. To this logarithm the silver on the plate is proportional.

As opacity may be measured by optical means, the density of any deposit may be ascertained, and in this way the relative amount of silver on different portions of the negative may be arrived at.

Having accurately defined their terms, Hurter and Driffield were now in a position to define a theoretically perfect negative as one whose various gradations transmit an amount of light in inverse ratio to that which the corresponding parts of the original send out; or, in other words, that the densities or amounts of silver deposited in the various parts are proportional to the logarithms of the intensities of the light from the corresponding parts of the object.

This definition, arrived at from theoretical grounds alone, required experimental confirmation, and it was evident that for accurate work methods must be devised for the measurement by photometric means of the densities of plates, and also for the impression of definite exposures on the sensitive film.

Early Photometer.

Dr. Hurter's Notebook (H.N.—A., p. 49) shows the plan of their first photometer (Fig. 7). A circular box with four openings at angles of 90 deg. round the circumference of the drum contains on a vertical spindle capable of rotation a Bunsen grease spot paper disc. Light from source A enters the beam 1_1, directly through one of the tubes and falls on the disc; another beam 1_2, reflected by a mirror passes through the tube at right angles to the first beam, illuminates the other side of the disc, and the eye at the opposite opening observes the disc with the fat spot.

At a certain angle of rotation the fat spot vanishes.

The strip to be measured being placed in the path of the beam I_1, equality is restored by movement of the disc through a certain angle, and it was hoped that in this way the amount of light transmitted by a silver deposit and consequently the density could be measured.

The mathematical theory of the instrument was worked out by Dr. Hurter at considerable length (H.N.—A., pp. 49-106), many improvements were made, and—within certain limits—it proved a reliable instrument, though it had to give way later to the well-known Hurter and Driffield photometer.

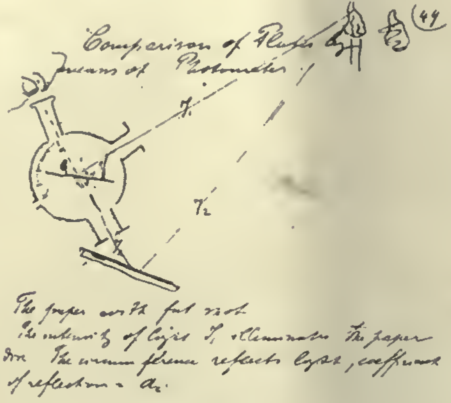
Comparison of Plates by means of Photometer
(49)
I_1
I_2
The paper with fat spot
The intensity of light I_1 illuminates the paper
do. The inner sphere reflects light, coefficient of reflection = a_2

Fig. 7.

The final form presented to the Royal Photographic Society by J. G. Warner, Esq., F.C.S., of Widnes, is shown in the Figs. 8 and 9.

With this instrument in its improved form many measurements were made of the densities obtained from the development of different exposures, and it is evident from his notebooks that Dr. Hurter was on the look-out for some mathematical formula which should express the relation between exposure and density, but with the exception of the discovery that on any given plate there was a limit to the density due to exposure, little was at this time found out.

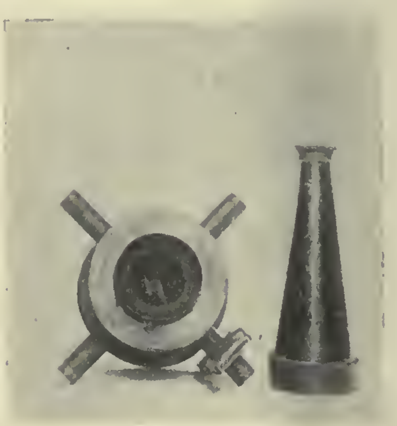

Fig. 8.

It will be remembered that the foundation of the method of inertia determination by camera exposure was the obtaining a plate with such an exposure as would give a satisfactory printing negative, and the question was by what physical criterion could one judge whether a negative was properly exposed or not.

A series of density measurements by the photometer led to the conclusion that in the case of a rightly exposed landscape negative there is a definite ratio of density between the sky and the grass which is about 1.7 to 1 (H.N.—A., pp. 107-121).

This is interesting as being the first mention of that ratio of densities which plays so important a part in their later work.

Exposure Methods.

In the work to be done so much depended on impressing the plates with exposures of varied but definite amount that I should like to draw attention to the methods used for this purpose by Hurter and Driffield before they adopted the sector wheel in 1891.

In the first piece of apparatus a dark-slide was arranged so that it could be moved forward by definite amounts behind a narrow slit closed by a flap shutter, and so successive bands of varying exposure could be obtained on the plate.

In another arrangement used for the purpose, a quarter-plate was held in a circular drum, rotating behind an aperture covered with a movable shutter, so that eight patches of exposure could be made on the plate.

In addition to these pieces of apparatus a method (H.N.—A., pp. 135-140) was adopted of exposing behind an artificially graduated half-plate negative. One-quarter of this was bare glass and the other three-quarters were respectively covered with one, two, and three thicknesses of translucent paper: the densities of each part were measured in the photometer then in use and the intensities of incident light transmitted were calculated.

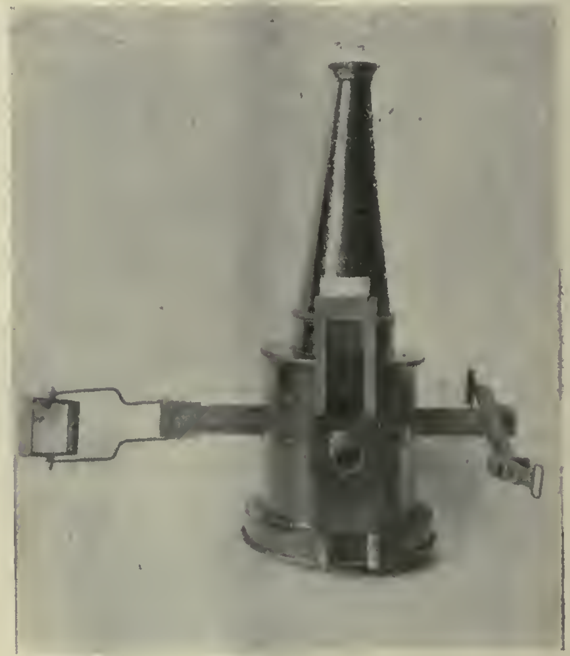

Fig. 9.

Behind this rather crude form of step wedge, plates were exposed—some to diffused daylight and some to candle and lamp light—for 2·5, 5, 10, 20, and 40 seconds.

The plate being developed, the various positive densities were measured, tabulated and compared in every detail, and the following table, part of one which appears in Notebook H.N.—A., p. 137, is interesting, as it led to the discovery of the important formula expressing the relation between density and exposure.

Exposures.	3 Papers.	2 Papers.	1 Paper.	Clear Glass.
2·5 seconds	1·00	1·41	2·10	2·64
5 seconds	2·00	2·82	3·80	4·40
10 ,, ...	3·35	4·10	5·06	5·81
20 ,, ...	5·06	5·64	6·60	7·10
40 ,, ...	6·35	7·16	7·85	8·60

The figures were obtained by dividing the actual densities measured by the density produced by an exposure of 2.5 seconds through the part of the negative covered with the three papers.

The mean increase of density for each doubling of the exposure in the three-paper column is $\frac{6{\cdot}35 - 1}{4} = 1{\cdot}34$, and if a series of densities be calculated by successive additions of 1.34 to the first density we get:—

Exposures.	Observed.	Calculated.
2·5 seconds	1·00	1·00
5 seconds	2·00	2·34
10 ,,	3·35	3·68
20 ,,	5·06	5·02
40 ,,	6·35	6·36

The close correspondence of these figures was at once noted and showed that for every doubling of the exposure there was an equal increase in the density. In order to get rid as far as possible of the effects of experimental irregularities, a table (H.N.—A., p. 138) was made by adding together all the densities produced by the same time of exposure in the last table, and the following figures were obtained:—

Exposure.	Sum of *observed* densities.	Densities *calculated* by continued addition of mean difference to the first density.
2·5 seconds	7·15	7·15
5 seconds	13·02	12·85
10 ,,	18·32	18·55
20 ,,	24·40	24·25
40 ,,	29·95	29·95

$$\frac{29{\cdot}95 - 7{\cdot}15}{4} = 5{\cdot}70 = \text{mean difference.}$$

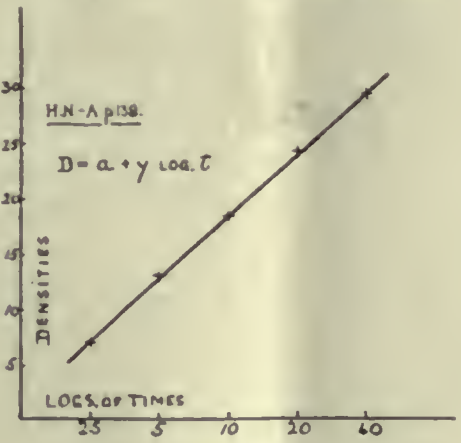

Fig. 10.

Fig. 10 is a graphic representation of the above table.

The Notebook then states:—

"This calculates a series as above which shows that the density increases according to

A Law

$$D = a + \gamma (\log t),$$

where t is the time of exposure.

That is to say, here was a full experimental proof of the correctness of the theory that the density is proportional to the logarithm of the exposure to which it was due.

W. B. Ferguson, K.C., M.A.

(To be concluded.)

◆

Holiday Closing in Londonderry.—The one outstanding firm against co-operative closing has, we are informed, joined in the movement, and unanimity now exists among the photographers in that city.

Assistants' Notes.

◆

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Working Strength of Amidol.

Amidol is extensively employed among professionals, but while a great number agree as to its advantages, there is an amount of dissension as to the best strength and the relative proportions of the constituents for obtaining good results. In some cases the use of amidol is the cause of loss, either through false economy or (more likely) extravagance. To examine every individual formula extant would require much space, therefore something near their average will serve. This would be:—

Sodium sulphite	4½	ozs.
Amidol	190	grs.
Water	80	ozs.

A developer compounded as above will prove equal to most requirements, though most formulæ include more amidol. On the other hand, a well-known firm of chemical manufacturers reckon that 140 grs. is quite sufficient to the winchester (80 ozs.), and if my own experience is worth notice, I have cut it as low as 90 grs., which (with 3 ozs. of sulphite) I found gave good results when printing from hard negatives, two points about it being freedom from the production of "bunged up" shadows and an extremely fine tone obtained on toning in the hot hypo-alum bath. The use of such a weak solution is, of course, not quite so saving as it looks. A winchester of it could hardly be expected to go as far as one at twice the saturation, but it is economical even so, and is also more merciful to the fingers.

To obtain absolutely the best results from amidol, it is necessary to adjust its strength to certain other printing factors, chief among which are, the character of the negative, the c.p. of the printing light, and the nature of the printing paper. Considering the negative, it is manifest that a powerful developer capable of giving a bold result from an over soft negative, will not be suitable for prints from a "lime and charcoal" one. With regard to candle power I may be told that it is irrelevant, as 100 seconds at one c.p. light is equivalent to one second at a light of 100 c.p., but I contend that this is wrong. The power of the lamp has an effect on the quality of the print just as it does when enlarging or P.O.P. printing.

Two enlargements from the same negative, one by mercury vapour and the other by lime-light, will not be of similar quality. Two P.O.P. prints, one done by sunshine and the other printed in the shade or under yellow glass, will not be identical. This difference is apparently due to the stronger or the more actinic light being able to penetrate densities that are opaque, or nearly so, to the weaker or less actinic one.

Therefore a print by a weak yellow light will tend to be bolder than one from a strong white light unless the developer is adjusted to correct the difference.

The emulsion of bromide papers varies and so the solution that will give a rich deposit with one brand of paper may not be the best for another. Usually a slow vigorous paper will need less amidol than a fast soft one.

It is generally conceded that a manufacturer knows his paper better than anyone else, and this being so, the makers formulae should be the best. It must be remembered, however, that the other factors are not bound to be the same with maker and consumer, and while the recommended formula is capable of such fine prints from the maker's negatives it may not give similar prints from a totally different style of negative, and even when it does there may be no harm in economising the amidol a little. While giving the manufacturer's directions full consideration, a user should always examine things practically for himself.

When experimenting with the strength of amidol solution it will be found that to obtain different results the amidol must be increased or decreased to a greater degree than the sulphite. Altering both in proportion will only mean dilution, or concentration, and apart from a change in the speed of development, and possibly the rate of contamination, this will have no great effect on the finished result. When increasing the amidol alone it is possible to overdo it; there is a point where more amidol renders the solution inactive; with the amidol nearly at this proportion the developer soon exhausts, but revives on the addition of fresh sulphite solution. It is very doubtful though if any advantage is obtained by using more amidol than that figured in the strongest of maker's formulæ, i.e., 240 grs. to 4 ozs. of sulphite and 80 ozs. of water.—THERMIT.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications June 24 to July 6.

FILM CARRIER.—No. 10,751. Carrier or holder for photographic film negatives. F. R. E. Curtis.

CINEMATOGRAPHY.—No. 10,696. Motion picture operating machines. D. P. Dodd.

CAMERAS.—No. 10,543. Photographic cameras. D. A. English.

RETOUCHING.—No. 10,640. Electric pencils for retouching photographic negatives. C. S. Franklin.

CINEMATOGRAPH SHUTTERS.—No. 10,381. Shutters for cinematograph machines. E. Tassie.

CINEMATOGRAPHY.—No. 10,696. Motion picture operating machines. F. B. Wyatt.

SHUTTERS.—No. 10,422. Shutters. H. C. Austin.

CINEMATOGRAPH SHUTTERS.—No. 10,744. Cinematograph shutters. H. C. Austin.

ENLARGING.—No. 10,902. Apparatus for enlarging photographs. L. Lemaire.

PHOTO SURVEYING.—No. 11,222. Photo theodolite apparatus for use in ascertaining exact position of range of gun by photo recording gun-flashes directing artillery fire at night and for surveying generally. W. E. Clifton.

CINEMATOGRAPHY.—No. 11,447. Cinematograph apparatus. F. H. Trevellian.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

L. L. DESIGN.—No. 380,806. Photographic chemicals. Levinstein, Limited, Crumpsall Vale Chemical Works, Blackley, Manchester, chemical manufacturers. Nov. 28, 1917.

REGISTRATIONS RENEWED.

IMPERIAL (LION DESIGN).—No. 266,167. By Imperial Dry Plate Co., Ltd., in 1904. Class I.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

DIOMET.—No. 380,785. Photographic developers (chemical). White Band Manufacturing Co., 121, Selsdon Road, South Croydon, Surrey, manufacturing chemists.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

TUESDAY, JULY 30.

Hackney Photographic Society. Affiliation Competition Prints.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A MEETING of the Council was held on Friday, July 12. Present: Messrs. Marcus Adams, A. Basil, Gordon Chase, T. Chidley, C. F. Dickinson, S. H. Fry, W. E. Gray, G. Hana, W. Illingworth, A. Mackie, T. Reveley, Lang Sims, and R. N. Speaight. New members during the month, 7.

Letter read from the hon. secretary of the Society of Master Photographers (Lancashire and District) asking if the Council could advise in reference to the one-man business scheme. The reply was that the Council had seriously considered what could be done to help members, but it seemed impossible to devise means to deal with individual cases spread all over the country from a centre. To deal with the position in trade divisions did not appear to be practicable, but the same difficulties did not arise with divisions into local groups. A local committee could deal equally well with all classes within its sphere of action.

Mr. Lang Sims stated the proceedings of the Business Men's Association.

Letter read from Mr. G. E. Markcrow in reference to a proposed association of professional photographers for Sheffield, and the hon. secretary's reply.

Mr. R. N. Speaight read correspondence between the Director of the National Portrait Gallery and a gentleman who had been invited to give a sitting for his portrait, showing that the National Portrait Gallery is now accepting photographs without insisting on a special sitting.

Messrs. Marcus Adams and George Hana gave full particulars of their negotiations with the authorities of the Photographic Section of the Royal Air Force, and the hon. secretary also gave an account of the treatment accorded him. It appeared evident that the efforts of the Association to assist the Royal Air Force to obtain photographers urgently needed in the Photographic Section would be unavailing owing to the impossibility of overcoming the inertia of official methods.

The case was reported of a member who had displayed an enlargement in his window, made from a negative produced in the ordinary way of business for a customer, and had received a letter from his customer's solicitors demanding delivery of the enlargement, a sum as damages, and the solicitor's costs. It being undoubtedly an infringement, the only course was to make the best terms possible.

Letter read, addressed to the President, suggesting that the P.P.A. should undertake the compilation of a list of names of the professional photographers who are serving in the war, giving their regiment, rank, and any honours or decorations they may win; also the President's reply to his correspondent, pointing out the difficulties that would arise in carrying out the suggestion.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the meeting last week the subject discussed was "The Perfect Negative," and every member had brought something along to talk about.

One member showed a very interesting set of negatives as a severe warning against the use of a horizontal tank. The negatives in question had been absolutely ruined owing to the fact that the backing had dropped off in flakes and had settled down on the film of the plate beneath and had then stopped development. It was also pointed out that if pyro was used for tank development it was absolutely essential to reverse the tank fairly frequently, otherwise reticulation set in.

Mr. G. C. Perry produced a set of very fine negatives, but all on the thin side. The enlargements he had made from them bore out his statement that, thin as a negative might look to the eyes, fine quality enlargements could be made if the right grade of paper be used. He preferred amidol to any other developer; it not only gave him soft negatives, but ample density and quality where bromide enlargements were concerned. Mr. Perry, whose portraiture is well known to most amateur workers, stated that in his opinion in a three-quarter length figure the head would appear too small unless the model was taken in a slightly profile position.

Other members, including Messrs. Davies, Howard, McEwan, the President, and the Secretary, put forward their views, which were decidedly interesting and instructive. For instance, for interior work a Wellington anti-screen plate, even unbacked, gave results which could hardly be equalled by any other plate; at least, that is the experience of one member, and for development he preferred to use dilute amidol; it gave a nice soft result, with ample gradation and quality.

The President (Mr. F. Slater, F.R.P.S.) stated his views on time and temperature development, and his opinions were much appreciated. He also showed a very instructive set of negatives and prints, demonstrating that correct development of even a badly under-exposed plate would provide the best results it is possible to obtain under such circumstances.

Other members produced negatives of groups and portraits. Mr. Howard passed round some very fine half-plate portrait negatives, all of which he had kept on the "soft" side by suitable development.

Questions were raised as to what was the effect of the addition of bromide to the developer. One worker offered to expose two plates identically and produce the effects of under-exposure and over-exposure by the omission or addition of potassium bromide. It remains to be seen whether the society will ask for a demonstration.

News and Notes.

Beach Photographer Fined.—The Blackpool magistrates ordered Leonard Smith to pay a fine of 20s. for selling photographs on the sands without permission. Defendant said he had got a new camera, and he was eager to get to work.

The London Salon of Photography.—The entry forms for the exhibition of the London Salon of Photography are now ready, and obtainable from the Hon. Secretary, London Salon of Photography, Galleries of the Royal Society of Painters in Water Colours, 5a, Pall Mall East, S.W

Death of Mr. Frederick Converse Beach.—In the "Scientific American" for June 22 the death is announced, on June 8, of Mr. F. C. Beach, late secretary of Munn and Co., Inc., publishers of the "Scientific American." Mr. Beach, who was in his seventy-first year began his activities in the photographic world in 1864. He was one of the first amateurs of any note in America. He founded the New York Society of Amateur Photographers (now the Camera Club) in 1880, and in 1889, with Miss Catherine Weed Barnes, he started the "American Amateur Photographer," of which for many years he was the editor. The venture was a success, and, after absorbing several less known publications, it appeared under its present title of "Amateur Photographer." Mr. Beach's chief interest was in the Lantern Slide Interchange, of which he was manager, and in which he offered several prizes for competition. Through the Interchange various camera clubs throughout America sent selected slides to Mr. Beach, and a committee met regularly in New York for the purpose of selecting 100 of the best slides, which were distributed to the various camera clubs for exhibition It should be mentioned that for many years Mr Beach was active in promoting the Postal Progress League, of which he was president. The League was largely instrumental in securing the establishment by Congress of the parcel post. Some years ago the name of F. C. Beach was well known in this country in connection with a pyro-potash developer which he invented, and which was widely used all over the world Mr. Beach was possessed of sterling qualities that won for him the respect and affection of a wide circle of friends and associates.

Society of Master Photographers (Lancashire and District).—A general meeting was held at the Bee Hotel, St. John's Lane, Liverpool, on Tuesday, July 16, Mr. N. S. Kay in the chair. The rules of the society, as passed by the committee at the afternoon meeting, were read, passed, and confirmed The President gave a résumé of the society's doings since the inaugural meeting, and emphasised the desirability of unity and co-operation. Mr. Chidley, of Chester, who had attended the last P.P.A. Council meeting in London, expressed the pleasure of the Council at the progress of the new society. He explained the paragraph which had appeared in the "British Journal" with reference to photographers and the R.A.F., a further appointment with the authorities had been made, and a report of the same would be forwarded to the trade. Mr. Chidley advocated every member becoming a direct member of the P.P.A., so that the full weight of the profession would be upheld in movements that the P.P.A. took up.

Mr. Watson, of Blackpool, thought the society had done good work, promoting holiday weeks throughout the country during Wakes weeks. He added that in Blackpool they were trying to secure a half-holiday closing, even in the busy season, which would greatly benefit the Blackpool assistants, who had to work long hours during the season.

Mr. Kenworthy, of Oldham, gave a most interesting address, and reviewed the position of photography in its early stages, and prophesied that the conditions after the war would be very different from what we are expecting; and it was up to every photographer to keep his business up to date, and to endeavour to work with his fellow photographers in the same town He gave several instances of the inefficiency of assistants who had passed through his hands, and this was one of the questions to which the committee were devoting considerable attention. Another important matter brought forward by Mr. Kenworthy was the continual upward tendency in prices of all photographic materials, and suggested that by unity and co-operation they might eventually be able to bring the prices down.

Several new members were then enrolled by the hon. sec., and the date of the next meeting was fixed for Tuesday, September 3, in Preston.

A vote of thanks to the chairman for presiding brought a very successful meeting to a close.

Correspondence.

** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

** *We do not undertake responsibility for the opinions expressed by our correspondents.*

CO-OPERATIVE CLOSING AT LONDONDERRY.

To the Editors.

Gentlemen,—I am pleased to inform you that all the Londonderry professionals have agreed to close down for Bank Holiday week.

To make this innovation successful, one energetic professional in every town or city should make a personal call on his fellow professionals and competitors (if you like), talk the matter over and after a little tact and patience the thing is done.

Hoping others will follow our example.—Yours faithfully,

E. G. Harris,

July 22. Hon. Sec. Local Branch P.P.A.

SLOW AND FAST PLATES.

To the Editors

Gentlemen,—I was very glad to see your paragraph re the above. I have done a good deal of architectural photography, and always use a slow ordinary plate, except when windows are included, and then I use Wratten or Ilford panchromatic plates. I quite agree that people only need to realise what a slow plate will do. But patience, I fancy, is at the bottom of what is wanted. Slap-dash seems the favourite pastime. I was taught that "hurry" was the enemy of this art. Slowness has been my salvation, hand in hand with cleanliness. Many a time I have been laughed at for being too particular, but it has never let me down yet.—Yours, etc.,

Glossop, July 19. A Keen Amateur.

IRON PRINTING PROCESSES.

To the Editors.

Gentlemen,—I was very interested in your article on Iron Printing Processes, particularly the section dealing with the ferro-prussiate process. Some years back I served a term of years with a large engineering firm as staff photographer with charge also of the plan printing. I thus came to experiment with the "blue-print" paper with the object of finding whether I could use it instead of bromide for rush jobs. I enclose you a print for your inspection, and perhaps you might compare it with any you have made by the various methods.

My method was considerably to over-expose the print, then wash out thoroughly with plain water, and hang up to dry. When dry immerse in a very dilute solution of liquid ammonia. The action is one of bleaching, and I found that the nasty green and blue colour of the old print was cooled to a rich deep blue. But most important of all, the ammonia cleared the whites of the print, which I found no other method to do. It was a distinct advantage to let the print dry first before bleaching. Some makes of paper will give much better colours and surfaces than others, this being simply a matter of testing.

I feel confident that a pleasant surprise is in store for any who care to make use of this ferro-prussiate paper.—Yours sincerely,

G. W. Pilkington.

Glasgow, July 22.

[The print sent is of excellent quality, the whites being quite pure and the shadows a very deep colour.—Eds "B.J."]

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

H. M.—If of the G.E.C. make the original price was £3 for 3,000 c.p., but the present value must largely depend upon its condition. If there is much yellowness on the globe it is worth very little for photography. The estimated life of these lamps is 800 to 1,000 hours..

S. B.—You can obtain a gaslight printer from the Tress Co., 4, Rathbone Place, Oxford Street, London, W. This could be easily altered to take an oil lamp, as it works with a shutter and not a switch or tap. G. S. Moore, 69, Denmark Hill, Camberwell, London, S.E., also makes a special oil pattern.

J. M.—It is impossible to identify the Ross lens by a number, except to say that yours is pretty old. The value of the Lancaster lens depends on its performance. A good lens of this type should fetch £2 to £3. The numbers explain themselves. F. stands for focal value and Time for relative exposures with each stop.

Lens.—The lens is evidently the Goerz double anastigmat, afterwards issued under the name of the Dagor. The 7-in. lens was listed before the war at £8 5s. in focussing mount. We should say that its value at the present time to a direct purchaser is about £6. The additional value of the focussing mount is not of very much account just now. as there is little demand for this form of mounting.

Miniatures.—You appear to have been in error in wetting the prints in water and also in using diluted spirit. You should soak the dry print in strong spirit and after placing in contact with the celluloid, blot off any excess used and press into close contact with a hot roller until all bubbles are removed. As it is now difficult to get methylated spirit Messrs. Fallowfield are selling a special dry-mounting solution for the purpose; perhaps you would get on better with this.

Gelatine Reliefs.—Kindly give a gelatine process that will cause the plates to swell sufficiently to make extreme black-and-white cards without half-tones and using materials available to be printed in presses.—A. F.

If you require block to print as ordinary letterpress we are afraid there is no process available. Swelled gelatine will not stand the pressure necessary and dry gelatine would not have enough relief. Photo-litho or photo-zinco would be simpler, or a simple collotype ought to answer.

Metal Developing Dishes.—I am desirous of making some developing dishes or trays out of copper sheet, muntz metal, or ordinary tinplate, with soldered joints at the corners. Will any of these metals have an injurious effect on plates or papers provided they are kept clean and used only for the above purpose?—J. S. B.

All the metals you specify are liable to be corroded by developing solutions unless well protected by a coating of asphaltum varnish, or heavily nickel-plated. Lead is much less liable to attack and is in common use for lining dishes, troughs, and the like.

Lenses.—(1) I have a ¼ plate R.R. lens full aperture $f/8$, which does not give a sharp negative except when stopped to $f/32$. Should it focus sharp at $f/8$, or is it defective? Lens not named. (2) Also a Ross marked S.A. doublet 8½ by 6½. Is this a portrait or landscape lens, and what is the focus?

1. The R.R. lens should give sharp definition in the centre of the field at $f/8$ and should cover the whole plate fairly well at $f/16$. Your lens may be of fair quality but out of adjustment through a fall or blow. 2. This lens is intended for general outdoor work, copying, etc., the focal length is about 11 or 12 inches.

Narrow Margins.—Can you kindly inform me how to obtain the narrow margin round postcards? The margin produced by the printing frame I use is a good ⅛ of an inch.—Vasco.

You cannot do better than to procure one of Butcher's Klimax printing frames, which will give you any desired width of margin, always perfectly even all round. The special masks are also sold separately in shilling packets. You can easily cut the opening to any desired size. Or you can get orange celluloid masks from Kodak, Ltd., and use them in a half-plate frame, so that very little of the margin is covered. It will, of course, be necessary to provide a cut-out card with an opening 5½ x 3½ to take the negative and to fix the mask upon that.

Negative Stains.—Some negatives (dark backgrounds) were taken from the hypo and exposed to strong light before they were properly fixed, the unfixed parts turned to stains, yellow looking through but white from the glass side, and taking shapes somewhat mottled. Prolonged fixation does not remove them. One negative necessitated intensification (bichromate and hydrochloric acid formula), but still they turn up. I should be very glad to know if it is possible to remove the stains.—G. C.

The stain is probably due to the formation of a silver compound by exposure to the air, not light, before the plate was fixed. A weak solution, say 10 grs. to the ounce, of potassium cyanide might remove it from the unintensified negatives, the intensified ones are, we fear, hopeless.

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Entries close September 3. Hon. Secretary, 5a, Pall Mall East, S.W.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

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SUMMARY.

In choosing a lens for a studio of given length the photographer is well advised to select the longest focus he can up to a maximum of, say, 15 inches. In a leading article we show how the best focus can be easily calculated in reference to the available length of the studio and the description of the work, which is chiefly done in it. (P. 347.)

The concluding section of the first Hurter and Driffield Memorial Lecture, with a summary of the results obtained, is given on page 347.

A very useful hint as to a method of brightening a fogged untoned proof so that it can be successfully copied will be found on page 346.

A recommendation to substitute a methodical way of working in place of the hurried slap-dash methods practised by many photographers is given in "Assistants' Notes" on page 349.

Under the heading of "Patent News" abstracts of patents for securing stereoscopic effect in cinematography, imitation oil paintings, folding pocket cameras, and an optical distorting apparatus for use on a cinematograph camera will be found on page 350.

There is no better or safer method of removing the brown silver stains due to contact with damp paper than that of rubbing the stained parts with an abrasive paste and then leaving the negative to soak for as long as is necessary in a strong solution of hypo. (P. 345.)

The very interesting exhibition of naval photographs at the Prince's Galleries, Piccadilly, which is now open, is noticed on page 351.

A hint to experimenters in photographic processes, who may publish formulæ, is that these should be worked out with pure chemicals so that they can be tried with success by any one who takes a similar precaution. (P. 345.)

A further announcement of the Exhibition of British Scientific Products at King's College, Strand, which will remain from August 12 to September 7, is made on page 349.

Dirty hypo, reversed negatives, drying plates and paper, and studio lighting are among the subjects dealt with in "Answers to Correspondents" on page 352.

"Colour Photography" Supplement.

A thoughtful article on the possibility of utilising the cathode rays to secure permanency in prints made by the bleach-out process is given on page 29

The influence of the intensity of illumination in determining the colour quality of Autochromes is dealt with in an article by Mr. Noel Deisch on page 31.

Process of making colour-screen plates both of broken and mechanical grains, and a method of colouring celluloid in the mass for use in the manufacture of such screens is given under "Decennial Practice" on page 31.

EX CATHEDRA.

Silver Stains. A trouble which is constantly cropping up among our querists is the brownish stain on negatives due to damp contact with the printing paper, such as P.O.P., which contains soluble silver salt. If the stain is noticed within a short time of it having been produced its removal is a very much easier matter, but usually the negative is put away with the stain in an undeveloped state, and the defect is not observed until the negative is wanted again. The iodine-cyanide mixture is often recommended for the removal of these silver stains, but it needs considerable skill in use, inasmuch as it acts upon the image proper of the negative almost as energetically as upon the silver stain. A much better method is one devised some years ago by Mr. Harold Baker, and in our experience uniformly effective. It is one of those prescriptions which it is worth while to copy, and keep in a prominent position in the dark-room for use when the occasion may arise. The method consists in rubbing the dry negative with Globe metal polish (any moderately abrasive metal polishing paste) for a minute or two and then placing the negative in a strong solution of hypo, there to remain until the stain disappears. This may take only a few minutes or some hours, but given sufficient time it will be found to remove stains of this kind of the oldest standing. The hypo is useless without the preliminary polish, apparently for the reason that the rubbing removes some superficial deposit on or through which the hypo is incapable of acting.

* * *

Pure Materials. One of the hints which may be given to the experimenter in photographic processes is that results achieved in the way, let us say, of a formula for a toning solution, are of very little value unless they can be repeated by anyone buying the materials from different sources. And in order that that may be the case, it is clearly a condition that pure materials require to be specified. If they are not, it may easily happen that the results achieved by the author of a formula may turn out to be due to some impurity in one or other of the chemicals, and that therefore anyone employing a variety of the chemicals from which the impurity is absent will be disappointed in the results. Perhaps readers of Stevenson's dramatic fable, "Dr. Jekyll and Mr. Hyde," will remember that the tragedy of the doctor's end is brought about by the failure to obtain more of an old supply of the transforming drug, some impurity in which was evidently the potent substance. Differences of this kind between different brands of the same chemical employed in photographic processes have undoubtedly much to do with the failure of one worker and the success of another to obtain certain results. For example, liver of sulphur is a commercial sulphide of potassium which contains a great many impurities in the shape of sulphur compounds of a complex nature, and it is more than probable that the variations in quality of "liver" are responsible for the differences experienced in its toning action.

* * *

Copying Darkened P.O.P. Prints. When, as sometimes happens, the only print which a customer has and requires to be copied is one on P.O.P. which has not been toned or fixed, and has subsequently darkened somewhat by exposure to light, there is no need to put the order aside as one of those things which can't be done. As recommended some years ago by Mr. Ethelbert Henry, the use of a weak reducer made up according to the customary iodine and cyanide formula clears off a great deal of the general fog, even when the actual picture appears to have been entirely obliterated. But it is necessary to watch the process carefully, as the P.O.P. image is much more susceptible to the action of any reducer than that of a bromide or gaslight print. As soon as it is seen that the picture is reasonably clear, the print should be well washed in water; if sufficiently strong it may be toned and fixed, but usually it is quite sufficient to dry it in the dark in its still somewhat sensitive condition and to make a copy by artificial light; or it need not be dried for this purpose, but can be squeegeed on to a sheet of clean glass and copied whilst wet.

THE LENS FOR A STUDIO.

From the questions which regularly reach us, it is evident that the choice of focal length of lens for a studio of given dimensions is one of those things in deciding which on paper many a photographer finds himself at a loss. His difficulty no doubt arises from insufficient knowledge of the conditions which are the best for the production of portraits of pleasing "drawing" or perspective; or, even if these latter are fairly familiar to him, inability to rely upon himself to carry out the really very simple arithmetical calculations which are concerned in the matter. Hence the questions which are addressed to us, and which, in many cases, can only be partially answered for the reason that the querist overlooks the fact that it is just as necessary to take into consideration the description of work which he is doing as it is to base calculations on the length of the studio. Where the descriptions of work vary considerably—for example, from full-length carte-de-visites to half-length cabinet portraits—there is no one best lens for the purpose unless you are practically unlimited as regards the length of studio. But where, as is most usually the case, the studio does not exceed an overall length of, say, 18 or 20 ft., it is necessary to choose a lens for the class of work which forms the bulk of the output; or, alternatively, to make a choice of focal length which covers all the requirements, but sacrifices a good deal in the way of the most satisfactory perspective. It should be clear to the photographer who gives the matter his consideration that the best course to follow is to choose the lens most suitable for the bulk of his work, and if the length of the studio does not permit of its being used for other descriptions of portrait, to supplement it by an objective of shorter focal length.

The crux of the matter lies in the fact that the pleasing character of the "drawing" in a portrait—that is to say the good proportion of hands or feet in relation to parts of the sitter which are placed further from the camera—is conditioned absolutely by the distance of the lens from the sitter, and has nothing whatever to do with the focal length of the lens, except in this very important practical respect, that the use of a relatively short-focus lens will give a picture which is too small on the plate, yielding a negative which is useless for the making of prints by contact, and is only of service for the making of enlargements. Inasmuch as the everyday commercial conditions make contact printing a necessity, the photographer must needs employ a lens of such focal length that the image on the plate is large enough for his purpose. It is on this account that the advice is often given to use a 10 or 12 in. focal length for the sake of its good perspective. The form in which the advice is given is somewhat misleading unless it is realised that the use of such a focal length compels the photographer to adopt a distance of the camera from the sitter at which satisfactory "drawing" is secured.

Broadly, it may be said that this distance is about 10 or 12 feet. If the camera is never placed nearer to the sitter than this, there will be little occasion to complain of the exaggerated rendering of hands or knees which is often evidenced in portraits which are taken at closer quarters. And if the work in a studio were confined to one particular description—e.g., cabinet heads or full-length cabinets—it would be a very simple matter to say what is the best choice of focal length. But in view of the variety of work which falls to be done in most studios, it is necessary that the photographer should have a working acquaintance with the rules according to which he can quite easily calculate for himself the focal length which he should choose. We will therefore next endeavour to put these rules in the simplest form and to offer them for our readers' guidance in conjunction with the advice that where the length of a studio permits it is well to choose the longest focus of lens up to 10 or 15 inches for the ordinary types of portrait; for large heads direct a much longer focus is advisedly chosen, and for this special description of portrait the choice, in ninety-nine cases out of a hundred, will not be limited by the dimensions of the studio.

The foregoing considerations will perhaps be understood if it is borne in mind that, so far as the size of the picture and the focal length of lens required, the photographing of the human sitter is practically a species of copying upon a reduced scale, not quite such a precise operation as copying a flat drawing, but sufficiently amenable to the rules of copying for practical purposes. Thus, if we assume that a full-length standing figure on the average has a height of 68 inches and a "head-and-shoulders" a dimension of 30 inches, then the sizes of the images on the ground glass obtained for carte-de-visite, cabinet, and other sizes of print represent a range of degrees of reduction such as are set forth in the following table:

Name and Size of Photograph.	C. de V	Cabinet.	Boudoir.*	Imperial.†
Height of image on photograph.........	3	5	7½	9
For full-length portrait, reduction figure is	23	13	9	7½
For head and shoulders portrait, reduction figure is	10	6	4	3 nearly

* 8½ × 5. † 10 × 6⅞.

In this table the figures in the last two lines mean that (in the case of the C. de V.) the image is 1/23rd the length of the original full-length subject, and 1/10th the length of a "head-and-shoulders" subject. Similarly, in the case of a cabinet, the image is respectively 1/13th and 1/6th the length of the subject. Now these reduction figures provide a very simple short cut to the calculation of the longest focal length which can be used within a studio working space of given dimensions. For here is the rule, and it is one which the photographer should have no difficulty in keeping in his mind: *For practical purposes the distance from the sitter to the plate, whatever the focus of lens used, is the number of focal lengths represented by the reduction figure plus two focal lengths.* For example, in the case of taking a full-length figure in carte-de-visite size (reduction figure, 23), the distance from the sitter to the plate will be twenty-five focal lengths of the lens. In the case of a "head-and-shoulder" cabinet portrait (reduction figure, 6) it will be eight focal lengths. This is not a perfectly accurate rule, for it gives results which are a little under the truth: the distance, if expressed in inches, will be an inch or two greater, but never sufficiently greater to affect the usefulness of the calculations. Now for the application of our rule. We are working, let us suppose, in a studio of 20 ft. overall length, and require to calculate what is the longest focus of lens we can use for full-length cabinet portraits. Obviously it won't do to base this calculation on the wall-to-wall length of the studio. There must be some allowance for space behind the sitter and also for the photographer behind the camera. A customary allowance for these two factors is 5 ft., which leaves us with 15 ft. for the permissible distance between the sitter and the plate. Very good. Then, according to our table and rule (the former tells us that the reduction figure under these conditions is 13), the distance from sitter to plate is fifteen focal lengths—that is to say, the greatest focal length which one can use is one which, when multiplied by fifteen, makes 15 ft.; in other words, 12 inches.

At this stage should be mentioned a supplement to our first rule, namely, that, *when photographing at a given degree of reduction, the distance from the subject to the lens is the number of focal lengths equal to the reduction figure plus one focal length.* In the case we have just worked out it is, therefore, clear that the distance from lens to sitter will be fourteen focal lengths, or 14 ft. Thus the photographer will see, in choosing a lens of this focus for full-length cabinets in a studio of this size, that very little margin is allowed for making portraits where the degree of reduction is greater. A similar calculation would tell us that for full-length carte-de-visite portraits the longest focus which can be used is 7 ins., and therefore in such circumstances as these the wise choice is the 12-in. lens for cabinet work and the shorter focus for C. de V.

Let us make it clear that we are not tying the photographer down to the data in our table. We have adopted certain arbitrary standards, namely, 68 and 30 ins. respectively for a full-length and head-and-shoulders figure, and the dimensions 3, 5, 7½, and 9 ins. as those of the height of the average portrait in C. de V., cabinet, boudoir, and Imperial photographs. But it is perfectly easy to construct a table which may be strictly in accordance with an individual photographer's average requirements—for example, in postcard work. All that is necessary, in order to obtain the reduction figure, is to divide the height of the subject by the height of the image required on the print; the quotient is the reduction figure corresponding with our 23, 13, and so on. The case of a group photograph will perhaps make this clear. Required to find the longest focus which can be used for taking a whole-plate group measuring 12 ft. across in a 20 ft. studio. The image on the whole-plate will be, say, 8 ins. Twelve feet equals 144 ins.: 144 ins. divided by 8 equals 1/18th—that is to say, our reduction figure is 18. Allowing 5 ft. for placing of the group and for working space behind the camera, we have 15 ft. left, which distance, according to our rule, is 18 *plus* 2 equals twenty focal lengths. Fifteen feet equals 180 ins. One hundred and eighty inches divided by 20 equals 9 ins—that is the maximum focal length which can be used. A little working acquaintance with this working rule, coupled with a constant recognition of the fact that up to a focal length of 12 or 15 ins. it is always better to err in the direction of too long a focus than too short, will serve the photographer well in enabling him to choose the optical equipment which will best serve him in the studio.

THE EARLY WORK OF HURTER AND DRIFFIELD.

(The first Hurter and Driffield Memorial Lecture delivered by Mr. W. B. Ferguson at the Royal Photographic Society on May 14.)

(*Continued from page* 341.)

There was now no doubt in Dr. Hurter's mind that he had discovered the law of the influence of light on sensitive plates, and in his Notebook (H.N.—B., p. 1), he says: "If an experiment be made in which the time of exposure is prolonged in geometrical progression, the density of the plate is found to be in arithmetic progression," and numerous experiments are recorded which afford conclusive proof of the statement.

From the consideration of the Law as expressed in the formula

$$D_n - D_1 = \gamma\ (\log T_n - \log T_1).$$

if the density due to one exposure were known and also the value of factor γ, it is clearly possible to calculate what density will be given by any other exposure with that particular development.

But it was soon found (H.N.—B., pp. 5, 6) that the value of the factor γ was not the same in all cases and that its variations depended on development and it was henceforth called the development factor and written as γ (gamma)

Further experiments showed that the density due to light grows with the time of development up to a certain limit, and that the factor for the change of exposure into density will grow with each minute of development until full density is reached.

As an example, a plate was evenly illuminated, cut into strips, and the strips developed for different times.

Growth of Density with Increased Time of Development. (From H N.—B. p. 7).

Minutes developed.	Densities produced.
2·5	183
5·0	546
7·5	793
10·0	1103
12·5	1163
15·0	1173

As the development factor (always after this known as γ (gamma) was evidently a coefficient of considerable importance, it was necessary to devise some method for its numerical estimation.

A sensitive plate was exposed behind a negative of bands of two different densities, N_1 and N_2, and on being developed showed two positive bands, P_1 and P_2. It can be shown from the equation

$$P_2 - P_1 = \gamma\ (\log T_2 - \log T_1)$$

that

$$\frac{P_2 - P_1}{N_1 - N_2} = \gamma$$

and in this way the constant of development was first determined (H.N.—B., p. 10).

As Hurter and Driffield advanced in their work it was evident that to obtain more reliable results methods of still greater accuracy must be devised for the various measurements.

They became more and more dissatisfied with the photometer already described, and though new instruments, on the same general plan but modified and improved in detail, were constructed, a thorough and lengthy investigation—covering over sixty pages of Hurter's Notebook A—showed that the instrument could only be trusted for the estimation of such densities as could be measured by a rotation of the disc between 30 deg. and 60 deg., and that the measurements by direct reading of densities above 0.64 could not be relied upon. (H.N.—B., p. 42.)

The H. and D. Photometer.

The Notebooks of both men about the middle of 1889 show that they were engaged in devising a new photometer, and contain sketches of the general plan and details and also calculations for the scales of what is now known as the Hurter and Driffield photometer.

A photograph of the earliest complete instrument now in the possession of the Royal Photographic Society is shown (Fig. 11).

Numerous tests were made in proof of the accuracy of the machine; it was found possible to measure densities as high as 3.5. Many of the measurements made in their previous experiments were confirmed, and the instrument proved to be a most valuable aid to research, and, as Driffield says (D.N.—F., p. 17), "it is in photographic investigations what the balance is in quantitative chemical analyses."

Investigations were continued on a variety of subjects, such as the effect of intensification, the use of special step-wedge negatives to avoid errors of exposure, the results obtained by exposing one plate behind another, and the laws of reflection and absorption of light by diffusing media.

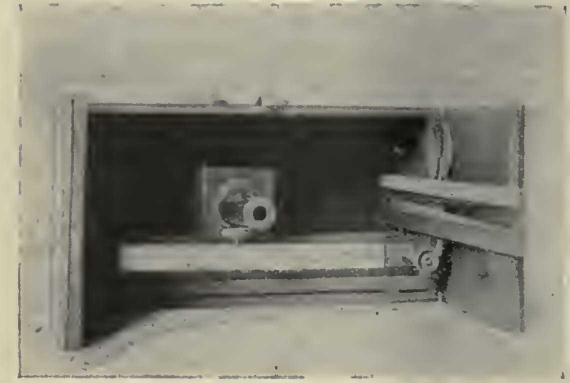

Fig. 11.

Speed Determination.

Dr. Hurter—with a view of discovering some method of determining the inertia (or its inverse, the speed) of plates which would be workable in the laboratory and quite independent of the camera—made further mathematical inquiries into the relation between transparency, opacity, and density of the silver image and the laws connecting exposure with its effect on the sensitive gelatino-bromide plate when submitted to development, and the relation between negatives and the positives printed from them.

Most of the actual experimental work was done by Driffield under the direction and at the suggestion of Dr. Hurter, and though many of the records of the work done at this time are unfortunately not to be found, yet enough remain to show what was the next method they used to determine the "inertia" of a plate.

In their earlier work they had defined the inertia as the least possible exposure necessary to produce a sky density of 2 on a landscape negative; next they took as the criterion of a properly exposed negative that when developed the density of the sky should bear to the density of the glass a ratio of 1.7 to 1 (H.N.—A., p. 108); and later on, after some experiments on photographing black crumpled paper balls, when the influence of time on development had been recognised, they preferred to regard the inertia of the plate as the smallest exposure necessary to produce the slightest deposit on the plate in those parts representing the deepest shadows of the original, the reason being that these very slight deposits are little altered by continued development. At what precise periods their change of view took place I am not able to say, and it was not until some time later that the periods of under-, correct-, and over-exposure were recognised which effected a further modification of their views of inertia. What was required was to find a numerical expression for the smallest exposure which would so affect a plate as to give a printable deposit on development.

This was arrived at in the following manner:—A definite exposure was made through a step wedge, and the densities on the resulting positive were measured. A chart was then made, in which negative densities of the step wedge were marked off as abscissæ and the corresponding densities of the positive marked as ordinates.

As an example (H.N.—B., p. 11):—

Negative Densities.	Positive Densities.
·900	1·84
1·01	1·76
1·22	1·48
1·36	1·23
1·55	0·995
1·66	0·823

When plotted it will be noticed that the points lie on a straight line which, produced, cuts the line of negative densities at 2.25, the meaning of which is that the least light which will affect the plate is the amount which, from the source used, would pass through a density of 2.25 (Fig. 12).

That amount of exposure is the "inertia," and following the definition of density already given can be ascertained from the equation—

$$\log \text{light used} - 2.25 = \log \text{of } i,$$

from which the numerical value of the inertia is ascertained.

The continued mathematical inquiries of Dr. Hurter led to various other methods of determining the inertia varying in their details, but founded on the principle in the method just given.

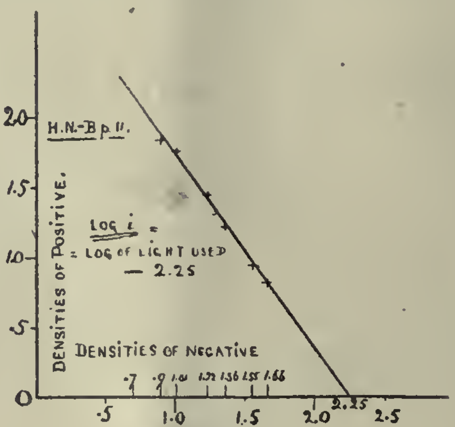

Fig. 12.

These may be followed in detail in the Notebooks and led to the formula finally adopted:—

$$\log i = \frac{D_2 \log T_1 - D_1 \log T_2}{D_2 - D_1}$$

given in the classic paper of 1890, together with the graphic method of solution by plotting on the well-known H. and D. diagram or chart.

Summary.

For fourteen years the two men had devoted their leisure time to investigation in the chemistry and physics of photography with a view of rendering the production of a technically perfect negative a matter of certainty, and they had in the course of their inquiry covered the following ground:—

They had in the first place defined transparency, opacity, and density, and explained the mathematical relations between them; they had invented a reliable instrument for the measurement of density and had shown that density on a negative was partly dependent on exposure, and partly on length of development, and that in each case it tended to reach a limit. As to exposure they had discovered the law which connected it with the resultant density, and though their complete work on development did not come for some years later, they had already established much as to the influence of the well-known development factor γ.

From theory confirmed by experiment they had shown that the density ratios due to exposure were unalterable by variation in the time of development, though an enormous change might be made in the ratios of the opacities and consequent steepness of gradation.

Experiments with long continued exposure when graphically represented had shown the existence of four different periods of exposure, under-, correct, over-exposure, and reversal.

They were able to give a complete mathematical expression to the relationships between exposure, development and density, and finally had invented practical methods—workable in the laboratory—of determining and exposing numerically the "inertia," and consequently the speed of a plate.

The time had come when the two investigators considered that the definite results of their fourteen years' work should be brought before the scientific public. They collected from the enormous mass of experimental data such matters as seemed to them to bear on the points stated above. Their views were reduced to a definite and orderly form, and their classic paper on "Photo-chemical Investigations and a New Method of Determination of the Sensitiveness of Photographic Plates," was read on May 31, 1890, before the Society of Chemical Industry at Liverpool, printed in Vol. IX., No. 5, of the "Journal" of that society, and will be reprinted in the proposed memorial volume.

In bringing to a conclusion my slight sketch of the early work of these two men, I should like to emphasise the fact that they worked together. Every investigation begun, and every conclusion reached, was their joint affair: they shared the work and were jointly responsible for every conclusion they published, and jointly now as *Hurter and Driffield* they are together entitled to the honour due to their work.

The two men brought to their task qualities differing in kind but equal in excellence. Dr. Hurter, in the first place a chemist and physicist with a remarkable power of insight into the probable nature of chemical reaction and physical change, was moreover a mathematician of unusual powers. For him mathematics was no mere intellectual exercise in the performance of operations with symbols. His symbols were a convenient shorthand for his ideas of the facts: and his signs of operation were the expression of the actual changes, whether atomic, molecular, or energetic in the problem be studied; and in the application of mathematical method to the solution of the problems inherent in the physical sciences he was unequalled.

It was Driffield, with his great knowledge of the practice of photography, who indicated the directions in which research was necessary, and with Hurter he discussed the methods to be employed. He designed—and in most cases personally constructed—the apparatus which became necessary for these investigations in an entirely new field of science.

To the actual experimental work he applied himself with rare energy, great skill, and a patience that was indefatigable, and the enormous amount of work done by him shows that in his case certainly was present that infinite capacity for taking pains which is the hall mark of genius.

W. B. Ferguson, K.C., M.A.

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An Exhibition of Scientific Products.—Under the auspices of the British Science Guild, an exhibition of British scientific products will be open at King's College, Strand, London, from August 12 till September 7 next.

The main object of the exhibition is to let the public understand that our scientific men and manufacturers can surpass German effort when conditions of development are favourable, and to establish for the future the independent position now achieved.

It will be shown that by the combination of science and industry we have done nearly as much in the four years of war as the Germans did in the preceding forty. More than 250 manufacturers are sending exhibits, and the Air Ministry will make a large display, as well as the Food Production Department.

We note that special prominence will be given to chemical and photographic apparatus, and that skilled attendants will explain the various exhibits, while short lectures and addresses will be delivered at intervals. Anyone in a position to assist in making the exhibition a success by the loan of apparatus or material or by contributions towards the necessary expenses is invited to communicate with Professor R. A. Gregory, British Scientific Products Exhibition, 82, Victoria Street, S.W.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Hurry versus Method.

Photographers, as well as other craftsmen, may be divided, roughly, into two distinct types. One type is the exponent of bustle. "There's only one way to do a job," he will say, "so get on with it." The other kind is the man who thinks there may be more than one way to do any particular piece of work, and spends a little time in deciding the plan of campaign, as it were. While it might not be thought surprising that the second man turns out better average work, it certainly does astonish the "hustler" when he sees the methods he considers dilatory and slow generally producing results quicker as well as better.

Take, for instance, such an ordinary matter as the making up of developer. The hustler will weigh up his chemicals, put them in a bottle, which he then fills with tap water, and feels his job is complete, barring the trouble of shaking up to get the ingredients dissolved. The other man will first of all put on a kettle of water and allow it to boil for a few minutes before using. While the water is getting hot he weighs out his chemicals on smooth paper, of which he has a boxful cut to a suitable size, one piece being used for each chemical and a spare piece being put in the weight-pan to ensure correct balance. By this time his more rapid confrère would have got his solution half dissolved · but this is the point at which the tortoise begins to gain on the hare. Having rinsed out a jug or jar, he pours into it some of the hot water, and, dropping the ingredients in one by one and stirring each well, he gets them dissolved almost instantaneously, while the other is still desperately shaking his bottle, and incidentally introducing a large amount of air, consequently greatly increasing the risk of stains and also rapid deterioration of the developer. In the case of metol-hydroquinone various troubles can generally be traced to "quick" methods of making solutions.

In much the same way the study and use of lens calculations for copying and other work may appear troublesome and time-wasting, but actually save time as well as energy. To go further, many jobs crop up which call for planning out to get the various operations to fit in with other work that may be in hand. For instance, suppose a number of enlargements are wanted from a dense negative, will it fit in with the existing apparatus and the skill available to make each enlargement separately or to make a negative of the required size and print by contact? Other questions that also require studying are the cost of material in either case, the approximate time that each method would take and the rate of pay of the workers involved, remembering that the cost of spotting a number of individual enlargements may greatly exceed that of an hour's careful preparation by a skilled person of the enlarged negative. Half an hour's calculation beforehand may thus often save many hours of slogging, tedious work at the end of a job.—D. Charles.

A War-Time Bromide Printing Note.

I was recently troubled by poor colours on my bromide prints, and for some time was at a loss to find the reason. The defect could not be traced to any of the usual sources; the negatives were first-rate for their purpose, the developer quite fresh, and the prints of good quality, the only fault being that the colour was a greyish black, instead of being a deep rich black. I had in my possession at the time prints from the same negatives upon the same grade of paper, all having had exactly the same treatment, and quite by accident I discovered the reason of my defective prints. Proceeding to make a further trial, I was called away, leaving the exposed print in the developer. I was absent only a couple of minutes, and upon returning I found that my print, which had been left in the developer, was of a deep rich black colour and in every way satisfactory. A further test then showed that with the particular batch of bromide paper development was fairly rapid up to a certain point, and then the action seemed to stop. If the print was then removed it was found to be weak and lacking in good colour; while if it was allowed to remain longer it gradually acquired its proper colour.

This effect was no doubt caused by some slight difference in manufacture due to war-time conditions, and it is in the hope of helping any fellow photographer who may be so placed that I write the above.—Expert.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Stereoscopic Cinematography.—No. 116,659. (December 21, 1917.) The invention comprises the combination with a camera of means of traversing it in a straight line whilst cinematograph photographs are being taken, and means for imparting rotatory movement to the camera whilst being traversed so that it remains continuously focussed upon a principal object. The camera is mounted upon an element capable of rotatory movement, the said element being itself supported by a slide-like part which is traversed by rack and pinion, screw and nut, or other means. The pinion or screw is operatively connected by suitable gearing with a worm, or the like, rotating wheel, secured to or formed in one with the rotatable element carrying the camera. As the camera is traversed by rotated pinion or screw, it is also given an angular movement, whereby it is maintained continuously focussed upon a principal object. Objects between the camera and the principal object thus appear to be moving in one direction and the principal object stationary or rotated. There are three distinct picture systems, and the one nearest the camera stands out in relief and is sharply defined, whilst, owing to the persistence of the principal object in the camera field, it has prominence given to it, thus imparting a stereoscopic effect to the picture. By changing the rotation of the gears operatively connecting the traversing screw or pinion and the rotating element, the one track or table for the camera and its actuated mechanism may serve for principal objects at varying distances from the camera. Herbert Shorrocks, 199, Brunswick Street, Chorlton-on-Medlock, Manchester.

Stereoscopic Cinematography.—No. 116,549. (June 16, 1917.) This invention relates to an improved device for giving a stereoscopic effect to moving pictures shown upon a screen by the arrangement of a proscenium of box or cone-shape, or painted to give or exaggerate such shape in order to produce the effect of distance; the screen is set at an interval behind the proscenium, and the picture thus exhibited as though shown at a distance through an elongated aperture. By arrangement of lighting thrown across before or behind the proscenium, but not impinging upon the screen, the effect is intensified, making the picture appear stereoscopic. Abraham Reginald Flint, 42, Full Street, Derby.

Imitation Oil Paintings.—No. 116,633. (October 3, 1917.) Improved means are claimed for imitating oil paintings and like pictures by embossing a coloured or other printed picture by the aid of a negative graining or texture plate. The negative bears canvas and brush markings, the latter being of fine or coarse character according to different positions; for instance, in the case of a portrait enlargement the brush markings are finer on the face than on the clothing portions. It is intended that one and the same negative be used for different pictures. Robert Sauber, British Fine Art Society, Waterloo Street and South Street, Hammersmith, London, W.

Folding Pocket Cameras.—No. 116,548. (June 16, 1917.) According to the invention a construction of the instrument is provided having a narrow frame forming three sides of a rectangle the closed side of which forms the front (made just wide enough to receive the lens). Two solid sides of suitable size and shape are hinged to this narrow front. A simple form of conical bellows connects this front with a collapsible back, hinged in the centre, top and bottom, and detachable from these sides, the hinges being fixed securely to the top and bottom of the frame at or near the ends farthest from the front, the two portions of the back being capable of swinging or folding towards the front, so that when this back is folded in two, these sides will close together and cover and contain the whole of the interior construction of the camera. To ensure rigidity contraction springs connect the solid sides together, so that when these sides are forced open, and the collapsible back assumes its correct position when open the solid sides are brought into close contact with this back, the right and left edges lodging between flanges or ridges fixed to the insides of the two solid sides near the ends farthest from the front, and the ends of the solid sides farthest from the front. The camera when closed will resemble a small flat box with slightly rounded edges similar in shape to a type of pocket cigarette case. The camera is operated as follows:—By pressing the push catch the solid sides can be forced open and the folding back extended—the two solid sides can then be released from the fingers when they will automatically come in contact with the sides of the collapsible back, and by turning back the small portion of the right solid side, the camera is ready for introduction of dark slide. George Waterlow, 14, Albion Road, Dalston, London, E.8.

Distorted Photographs.—No. 116,727 (Oct. 3, 1917). An invention for the improvement on present methods of producing distorted photographs. It consists in the use of a non-spherical lens, or lens formed of two or more portions, differing in optical value from one another, and so mounted that they may be rotated about an axis transverse to its general plane. Fitted to a cinematograph camera, the lens is rotated during exposure. William Henry Baker, 32, Hatton Garden, E.C., and William Millward, 34, Butler Street, Chorlton-on-Medlock, Manchester.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Measure Brand Design.—No. 382,365. Chemical substances prepared in Great Britain for use in photography. White Band Manufacturing Co., Ltd., 121, Selsdon Road, South Croydon, Surrey, manufacturing chemists. March 6, 1918.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

Rixmo.—No. 382,137. Photographic paper. Sternberg and Wertheim, Rosedale Road, Richmond, Surrey, photographic paper manufacturers.

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Entries close September 3. Hon. Secretary, 5a, Pall Mall East, S.W.

Canadian Imports.—A further note in the *Board of Trade Journal* states that, according to Customs Memo. No. 2215B, of June 18, photographs, drawings, pictures, illustrations, prints and engravings sent without charge to Canadian importers, and also blue-prints and building plans may, with the approval of the War Trade Board, be entered without licence.

Death of Major Bennett-Goldney.—Old Conventioners are amongst those who this week heard with regret of the death in France of Major Bennett-Goldney, M.P. for Canterbury, and six times mayor of that city. Although in ill-health at the time of the Canterbury meeting (1909), Mr. Bennett-Goldney did much in the way of entertaining members of the convention by inviting them to a garden party at his Abbot Barton residence, and reciting some Kipling poems in a masterly style at the annual dinner. At the time of his death—at Brest, and as a result of a motor-car accident—he was hon. Assistant Military Attaché in Paris.

Meetings of Societies.

CROYDON CAMERA CLUB.

Mr. B. J. Rose was down for "Pinhole Photography" last week. The chairman, Mr. J. Keane, in his introductory remarks, alluded to the interesting nature of the subject and to the lecturer being an expert in pinhole focal-plane work on lantern-plates. He then called upon him to begin, a request which produced an indignant assertion from an astonished Mr. Rose that the secretary had arranged for his appearance a week later; moreover he had left all his pinholes at home. A searching inquiry as to whether the mistake originated with Mr. Sellers or the advertised lecturer failed to throw any light on the matter, which was lucky for one.

However, in cases like this the club is never nonplussed, and Mr. Rose unearthed a collection of truly terrible reproductions of early English portrait painters, and discoursed on them relative to modern photographic portraiture in most luminous fashion, in fact in manner closely analogous to the propagation of light through space. But with this difference, that the movement of translation of the theme proper was extremely slow, whilst the transverse vibrations were of great amplitude and rapidity, and possessed radical differences in brain-wave structure. This made it impossible for any to fasten on to particular controversial vibrations, for by the time one had raised a contention based on one oscillation Mr. Rose had swung on to another, and obstinately declined to vibrate backwards. The chairman and the "office boy" were hot on his heels all the time without even a semblance of a bite, poor things, and in despair they finally turned on each other, and had a nice set-to on the platform of social reform.

Among other matters fully but not exhaustively dealt with by the lecturer and in the discussion were:—The art of painting from 2000 B.C., with a consideration of the fettering conventions of various periods, and what precisely would have happened if Coburn had preceded the Renaissance. Incidentally arose:—The furtherance of art by the R.C. Church and the reverse by the early Puritans. Slightly off the track, but of interest, were:—The beneficial advance of civilisation regarded also as a curse to mankind and the advantages of modern educational systems for machining the young into unthinking mentalities. Altogether quite an excellent informal evening—exceedingly informal as regards the opinions members expressed about one another. On Mr. Rose concluding his remarks a most hearty vote of thanks was accorded him.

The club reporter wishes to acknowledge with thanks a communication from Mr. H. Spink, of Brighton, suggesting that a discussion be initiated on the most easily made and easily worked still. An excellent idea, for the manufacture of whisky, of sorts, is a comparatively simple affair, and a Croydon Camera Club brand should compare favourably with that potent one on record, which necessitated clothes brushes being placed on the bar, so that customers might remove the dust from their garments after they had finished writhing on the floor.

Commercial & Legal Intelligence.

NEW COMPANIES.

Kilgannon and Sons, Ltd.—A private company. Registered in Dublin on July 17, with a capital of £3,000 in £1 shares, to acquire the businesses carried on at Thomas Street, Sligo, and at Rosses Point, Sligo, as Kilgannon and Son, photographers, photographic artists, etc. The subscribers (each with one share) are:—J. F. Kilgannon, 1, Thomas Street, Sligo, photographer and cinema operator; F. J. Kilgannon, Cairns View, Sligo, printer. The first directors are not named. Solicitors, Lynch and Deering, Dublin.

Holiday Closing at Torquay.—Four photographic studios in Torquay have combined to close from Wednesday, August 14, to Monday, August 26, in order to give their employees a holiday.

News and Notes.

Defence of the Realm.—At Littlehampton, Lilian Barrett, a visitor to Felpham, was summoned for being in possession of a camera in a prohibited area. P.C. Smith deposed that defendant was photographing her children close to the beach in Clyde Road, Felpham. Defendant, who expressed ignorance of the regulations, was fined 10s.

Itinerant Photographer Fined at Blackpool.—Frank Lloyd, charged at Blackpool with peddling without a licence, was stated by Police-constable Southworth to be an itinerant photographer, who went from door to door photographing groups of visitors. Lloyd said he did not think photographers came under the Pedlars' Act of 1871.—The Clerk (Mr. Singleton): Oh, yes, they do. We have had many cases before.—Defendant was fined 10s.

Eastman Kodak Company of New Jersey.—In addition to the usual quarterly dividends of 1½ per cent. (being at the rate of 6 per cent. per annum) upon the outstanding preferred stock, and of 2½ per cent. (being at the rate of 10 per cent. per annum) upon the outstanding common stock, the directors of the Eastman Kodak Company of New Jersey have declared an extra dividend of 2½ per cent. upon the common stock, all payable on October 1 to stockholders of record on August 31.

Tribunal Appeals.—At Whitehaven a photographer, 48, married, with three children, Grade 1, applied for exemption. It was a one-man business, and his only assistant was a girl. Eighteen months ago he enrolled for work of national importance, but was never accepted. He had now obtained work at Lowca by-product works on full time. He had a photographic but at Gretna, where he had a female assistant taking photographs, and he did the rest of the work at Whitehaven. All that she did was to take the photographs and send the negatives on to him. He was labouring now in the fitting shop and had 9s. a day. The application was withdrawn, relying on the fact that he had enrolled for work of national importance before he became liable for military service.

Enemy Patent Renewals Forbidden.—The Controller of the Foreign Office has revoked the licence of April 13, 1917, by which persons or companies in the United Kingdom might apply for a grant or renewal of letters patent or the registration of a trade-mark on behalf of persons whose names were in the "Statutory List." That list contained the names of persons with whom trading was forbidden by proclamations under the Trading with the Enemy (Extension of Powers) Act, 1915. When permission was given to make such an application on behalf of a person with whom trading was forbidden, the applicant was entitled to transact all the business which might be necessary to achieve his purpose. The revocation which is now published in the "London Gazette" gives notice that all matters and things which were by the said licence permitted, are, from July 27, prohibited.

Naval Pictures.—The Exhibition of Naval Photographs at the Prince's Galleries, Piccadilly, London, continues to draw crowds of visitors the only drawback to the show being the packed condition of the rooms. The coloured enlargements, all of which have been executed by Messrs. Raines and Co., are of an even higher quality than those exhibited at the Grafton Galleries, and the nature of the subjects makes more attractive colouring possible. The main point of attraction is a mammoth picture of the Vindictive, but many of the smaller prints are more artistic in character, some indeed possessing considerable pictorial charm apart from the subject. The exhibition as a whole should prove very instructive on subjects of which most of us are ignorant. Life in a submarine, the explosion of depth charges, the "oil patches" which indicate the destruction of an enemy U-boat, and many other technical subjects are of great interest; while pictures of smiling "Wrens" and happy patients and nurses touch a human note which is a welcome relief. One unfortunate thing which cannot be helped is the fact that many of the pictures are taken from airships or aeroplanes, and should be looked down upon, yet perforce that are hung above eye level.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

Justice.—If you will repeat your inquiry, giving your name and address, we will go into the matter. We do not answer anonymous letters.

Flash Powder.—The manufacture of flash powder is a risky business, and unless you require large quantities you will do better to buy a ready-prepared powder. There are several British makes on the market.

Enlarging Lanterns.—We do not know of any firm in this country supplying reflectors which can be used instead of the ordinary condensers. They can be obtained in the U.S.A. under the name of Parallax condensers.

Ginger Tones.—You are over-exposing and under-developing your prints. Cut down your exposures until you require two minutes development to bring out all detail. Do not exhaust your developer, and beware of weak sulphide solution.

Permanent Colours.—Although many of the coal-tar colours are as permanent as many pigments, they cannot as a whole be relied upon. Any good artists' colourman will supply you with a list of colours arranged in order of their relative permanence.

Mottled Bromides.—The fault appears to be in the paper used, not in the manipulation. We have seen similar effects from storing bromide paper in a damp place. Also at present it is very difficult to get suitable paper for the base, and this, added to the damp weather, may have been the cause.

Suter Lens.—I have a 15 by 12 Aplanat Lens by Suter of Basle. Can you give me the definition of same?—C. E.

There are two series of Suter Aplanats, $f/5$ and $f/6$. If you can give us the focal length, say, measured from the diaphragm to the ground glass on a distant object, and also diameter of front lens, we may identify it.

Reversed Negatives.—I wish to make some reversed negatives for carbon printing. What is the easiest and cheapest method?—S. T. C.

The simplest way is to expose through the glass, turning the film to the back of the slide and having a thin dark card to protect it from the spring. Take care that there are no spots or smears on the glass. The best way is to use a reversing mirror or prism before or behind the lens, this being the method used by process workers whose negatives are all reversed. A third way is to use a thin celluloid film and print through the celluloid.

Drying Plates and Paper.—My stock of plates and bromide paper has become quite damp in consequence of a leakage in the store cupboard. The packets have not been wetted but have been close to a wet partition. How can I dry them safely?—Pluvius.

Your best plan will be to remove the outer boxes and envelopes, which can be dried by a stove, and to put the plates, etc., into a large tightly closing box, together with a couple of pounds of chloride of calcium. This will dry them in twenty-four hours without heat. The box can remain in the dark-room during the process. You can dry the calcium chloride and use it over and over again.

Studio Lighting.—I have the option of acquiring premises where the ceilings are very low, not quite 8 ft. from the floor. The room is about 50 ft. by 28 ft. How would you advise me to light the same, or is the place too low to be of any use? I had thought of three half-watt lamps.—C.

Three half-watt lamps of about 1,500 c.p. each should prove sufficient. In view of the lowness of the ceiling it will be advisable to have one at least of the reflecting type which gives a general lighting from the whitened ceiling itself. This would serve as a high front light in the centre; the others may be placed lower and more to the side.

Foggy Negatives.—(1) The veil over your negatives appears to be due to faulty dark-room lighting, as it extends over the wire corners of the dark-slide. Try covering your lamp or window with brown paper so as to shut out all light, then fiell in, expose and develop a plate and see what happens. There is often a leakage of white light which is not noticed when the red or yellow light is on. If you use red fabric it is very likely that it has faded. (2) You are not likely to find a better lens than the 2B for your purpose. You can get depth in any lens by stopping down. The 2B has an aperture of $f/3$. At $f/4.5$ it will have the same depth as any other lens of similar focus.

Dirty Hypo.—We have tested the sample of hypo sent in the following way: 1 oz of it was dissolved in 5 ozs. water and 1 oz. of another very pure sample was dissolved in the same proportion, the temperature being the same in each case. An unexposed plate was cut in halves, and half placed at the same moment in each solution. Visible fixation was complete in 5½ minutes in the pure hypo; in your sample it took about 15 seconds longer; so that we do not think that there is much wrong with it except dirt, which you can eliminate by straining or by putting the crystals in a muslin bag while dissolving. A bromide print fixed in your solution quickly and cleanly. We should have thought that it would have been less trouble for you to make such a test yourself.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less 1/-
Extra words ... ... 1d. per word.
(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

"Box No." and office address ... ... charged as 6 words.
For forwarding replies add ... 6d. per insertion for each adv't.
If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH

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SUMMARY.

A fifth war-time advance in the price of dry-plates is announced and is the heaviest yet, viz., 33⅓ per cent. on the prices ruling since February last. Glass is said to be the cause of this advance and plates are to be supplied subject to delivery of negative glass to the amount of 75 per cent. of the emulsion-coated plates purchased. (P. 363.)

A very comprehensive series of formulæ and instructions in the preparation of different classes of photograph for colouring is contained in an article by an expert artist-colourist, who deals with dyes, water, oil and crayon colours and wax colouring in reference to matt and glossy gelatine and collodion prints, as well as to non-emulsion papers such as Platinotype. This article contains a number of long-tested formulæ not previously published. (P. 355.)

A paper by Mr. J. I. Crabtree, of the Eastman Research Laboratory, gives full working details for the dye-toning of transparencies by a method of bleaching with a bath of copper ferrocyanide. The copper ferrocyanide acts as a mordant for the dyes, and can be subsequently removed by a hypo bath. The method provides the means of producing a whole series of coloured tones on glass and cinematograph transparencies. (P. 357.)

The simplification which the careful selection of the type of plate introduces into the copying of different descriptions of original is the subject of a leading article on page 354.

Photographers who purchase negatives as a separate transaction or in buying a business require to remember that the rights which a sitter has in them continues to be so held notwithstanding the change in the proprietorship of the negative. (P. 354.)

Re-orders, even in cheap-portrait businesses, now figuring much more largely in the takings, adequate allowance needs to be made for the fact in the valuation of studio assets. (P. 353.)

The special, but not very general, usefulness of a portrait lens of 20 or 30 inches focus is a point in studio equipment which calls for consideration, particularly as regards the working aperture. (P. 354.)

The benefit which may be received by a portrait business in a small town through its proprietor's participation in the interests of the associations in his district is the subject of an article which we quote from "American Photography." (P. 360.)

Many interesting considerations of pinhole photography were *not* dealt with in a recent demonstration at the Croydon Camera Club. Our reporter, happening to know about them, must needs seize the opportunity. (P. 362.)

EX CATHEDRA.

Half-Plates at 8s. Those who strayed into a dealer's at the end of last week to buy a few plates must have been astonished at the increase in price which came into force on August 1—an increase which is by far the heaviest which the period of the war has witnessed, and is only a little short of the doubling of the old 2s. 8d. price, and this on the top of five advances since that price was in force. If, as we are told, the advance is largely due to the shortage and excessive price of glass, then it would appear that makers are not paying a very high price for cleaned glass negatives—in the half-plate size 7d. per dozen in comparison with the 8s. per dozen which is the retail price for a dozen emulsion-coated half-plates. If one allows for the customary trade discounts and the greater cost of coating plates "in singles" there would still seem to remain a margin which seems ample enough for adequate profits at a price less than that represented by the latest advance. On the other hand, other considerable factors than glass may come into play. Photographers who have accepted the four successive advances during the war without marked restiveness will, we imagine, wish to know more than makers have been in the habit of saying as to the exigencies which have made this last and greatest increase inevitable.

* * *

War-time Value of Negatives. The special circumstances occasioned by the war have introduced a new element into the valuation of negatives forming the stock-in-trade of every portrait business, and particularly those which have numbered soldiers of any rank largely among their customers. The new element is the very much greater proportion of business which is obtained in the shape of re-orders. Probably the degree to which the re-order has taken a large place in the business of a studio supplying portraits at a low or medium price has come as a surprise to many a proprietor whose previous experience has led him to look upon much of his large stock of negatives as so much dead material, to be kept as showing the size of his business, but not otherwise a major asset. The war, with its mixed tale of fatalities and distinctions, has had one effect of revising the money-producing value of negatives which have been in stock for a time measured in two or three years, or, maybe, as many months. While the duration of their value is as problematical as anything else is in these days, it would be ridiculous to assume that conditions can alter so rapidly that it can speedily sink to its former level. If peace were declared to-morrow the enhanced value, in the aggregate, of such negatives could not disappear for a long time to come, and therefore, in assessing the value of stocks of negatives, when the question of the sale of a business arises, it is no more than fair that their valuation should be based upon the actual amount of re-orders derived from them over a given period of time. Due allowance for this asset at the present time can easily enhance the value of a business to a very considerable extent.

* * *

The Long-Focus Portrait Lens. A lens of great focus for large portraits direct in the studio is an instrument which the professional photographer may be well advised to include in his equipment, even though he may anticipate finding little use for it in the regular work for his customers. The possession of such a lens, if its advantages—and limitations—are clearly recognised, ought to be the occasion of discovering that it can render good service in circumstances where the aim does not happen to be a large direct portrait. Expressed in a nutshell, the chief merit of a lens of 20 or 30 inches focal length is that it compels a greater distance, and therefore better drawing or perspective, between the camera and the sitter. In the case of a half-scale portrait, this distance is so much greater that a long-focus lens may be said to be a necessity for this description of work. With a 30-in. lens the distance will be only an inch or two short of 4 ft. as compared with 15 inches with a 10-in. lens. Let the reader, with one eye closed, steadily scrutinise a face at these respective distances, and he will get a rough idea of the greater naturalness of drawing at the greater distance. At less close quarters there is not such a vital difference, but one requires to be photographing any solid object on a very small scale before the superiority of a 30-in. as compared with a 10-in. lens ceases to be evident in this matter of drawing. Before this point is reached a limit is set in most cases by the length of the studio, for the photographing of a sitter, as a full-length cabinet portrait, with a 30-in. lens, calls for an overall length of studio of about 45 ft.

* * *

—and its Aperture. In choosing a lens of this great focal length it is necessary to bear in mind that it is only the central portion of its field which will be utilised, and consequently, as regards good definition, the rapid rectilinear type of lens is practically as good as an anastigmat. Moreover, it does not come within practical considerations to make choice of an anastigmat on the ground of the greater rapidity of its maximum working aperture. Owing to the very slight depth of focus obtained with lenses of such great focal length at anything like a large aperture it is seldom that a stop larger than $f/8$ can be used, and the rapid rectilinear working at this aperture will give excellent definition on a plate the longer side of which is about one-third the focal length of the lens. Obviously there is no purpose in paying the price for an anastigmat of maximum aperture $f/4.5$ or $f/6$ when it is necessary to stop it down to $f/8$ or smaller, and when at that aperture there is no superiority worth talking about over the definition obtained with an R.R. costing a third or a quarter as much. Indeed, for the single purpose of the portraitist the rapid rectilinear, owing to the somewhat less biting character of its definition and also to the brighter character of its image, may easily prove to be the more desirable type of instrument of the two.

* * *

Rights in Purchased Negatives. A question we are sometimes asked is whether the acquisition of negatives forming part of the stock of a business which is bought gives the purchaser the right to use any such negatives for the making of window specimens, etc. We are bound to say that the probabilities are against the existence of such right in the case of a given negative, though the consequences of ignoring the fact are not serious. It may be taken for granted that most of the negatives would have been made in the ordinary way of business, and that, therefore, the rights in them belong to the sitters, whoever and wherever they may be. There is nothing in any transaction in the way of the sale of a business which can transfer those rights from the original owners to the photographer. This question depends not on copyright merely, but on common law, whereby the implied contract between a photographer is to the effect that the negative shall be the photographer's property, but be used only at the wish or to the order of the customer. And this relation between the two parties holds good, even though the negatives come into the possession of a photographer other than the one who executed the order in the first instance. While we state the law of the question it is far from our intention to magnify the danger of protests or proceedings which might be incurred by ignoring it. It is probably a ten to one chance against anyone objecting to the use of such negatives which a photographer would select for his purposes, and which, evidently, would be the best among them.

THE SELECTION OF PLATE FOR THE COPYING OF DIFFERENT CLASSES OF ORIGINAL.

The copying of customers' originals is a branch of work upon which many portrait photographers look with a certain degree of disfavour, probably for the reason that it calls for an amount of personal attention out of proportion to the profit coming from it. The attitude arises, as we have pointed out from time to time in the past, largely from the lack of a little organisation for dealing with these miscellaneous commissions. This applies, in the first place, to the apparatus required for copying. Provided that a copying bench can be set up for use for this special purpose alone a great part of the objection to taking orders of this kind disappears, inasmuch as they can be dealt with promptly, without interfering with the use of cameras in regular employment in the studio or for outdoor work. Where space is limited a vertical type of apparatus is a great advantage, and can be designed to serve for practically all the copying orders which are likely to be received. But even if one is not prepared to go to the trouble and expense of getting made an apparatus of this type the alternative of buying an old-pattern field camera, equipping it with an R.R. lens, and mounting it on a board provided with an easel is an alternative which need cost only a few shillings, and supplies the means of copying an original with only a few minutes' preparation. Similarly, if directions can be drawn up for the guidance of assistants as regards the description of plate to be used for copying various descriptions of original and a small stock of plates kept for the purpose, it becomes a very much simpler proposition to turn over these copying orders to one's staff with something like reasonable assurance that the work will be done in the best way.

In this order of ideas, as our French friends say, originals may be usefully divided into three classes, namely, line originals (in one colour), tone originals (in one colour), and multi-colour originals, in which category we include not only coloured prints, line drawings in several colours, but also ordinary photographs which have yellowed with age, or from other causes exhibit staining of the ground. Probably these latter form the chief part of the originals which come to a photographer to be copied, but we will deal with each class in turn, and in doing so say a few words as to the practical measures which are of chief importance in the production of satisfactory copies.

For line originals the most suitable kind of plate is the "process," or "photo-mechanical," on account of the readiness with which almost any required density of ground may be secured in conjunction with almost perfect clearness of the lines. The process plate is slow—from 1-10th to 1-20th the speed of a studio portrait plate—but, providing copying can be done by daylight or with ample artificial light, the length of exposures is never such as to counterbalance the advantage of the clean and satisfactory negatives which the plates yield in the hands of an assistant of no more than the ordinary experience. Too often, it would seem, photographers who are called upon to make copies think that the ordinary rapid dry-plate can be made to serve. Undoubtedly, if the photographer likes to take the trouble, and is sufficiently skilful, it is quite possible to get satisfactory line negatives on a plate of this type, but to do so is a species of *tour de force* of which there was an instance a little while ago in the proceedings of the Royal Photographic Society when Mr. N. E. Luboshez, a most skilled photographer, explained how he had made satisfactory reproductions of a half-tone screen on a fast dry-plate. But what one wants for commercial purposes is a system which can be put in the hands of the semi-skilled assistant, and that is what the process plate provides. Indeed, these plates, apart from their special necessity for line originals, are the kind, if any one variety of plate is to be used, which is the best choice for all descriptions of copying. For it is remarkable, when one is accustomed to their use, what entirely satisfactory results they yield in the case of ordinary photographs, such as bromide or platinum prints, and even those which, by their colour, sepia or red chalk, call for a more rapid plate. Some few years ago a photographer, who at that time made copying work a specialty in his business, contributed to our pages an anonymous article, in which he gave full working details of the use of process plates for all kinds of original, including warm-tone P.O.P.'s, sepia prints, and even paintings in full colours. There is no doubt that the slow plate, with ample exposure, is capable of yielding results which in many instances would be thought to call for a colour-sensitive plate. While this is so, our own opinion is that the work of the copyist is best facilitated by the choice of the plate most appropriate to the character of the original.

This brings us to the second class—namely, originals, consisting of tones, as distinct from lines, in the negatives of which heavy deposit in the high-lights, coupled with clearness of the shadows, is not called for. For such subjects as these a plate of the ordinary, not colour-sensitive, variety, of medium speed, is the best choice. The latitude in exposure is considerable, the plate, even if it has been kept for a long time, works cleanly in the developer, and by development for a shorter or longer time it is most easy to obtain whatever degree of contrast in the copy negative may be necessary. Thus our specification corresponds with the kind of plate which is variously styled "ordinary" or "landscape" by the plate-makers in reference to its speed. It may be said to be on the average four to six times as fast as the process plate, a factor which will be found to be still greater in the case of originals of highly non-actinic colour, such as sepia or red-chalk prints. With these the exposure, particularly when none too powerful artificial light is the illuminant, will be found inconveniently long, whereas the "ordinary," or "landscape" plate brings the time of exposure within convenient limits, and the negative, when developed without any special precautions or special developing formula, is likely to yield more nearly a facsimile of the original than is the case with a process plate.

For multi-colour originals the copyist, if his work is to satisfy the discriminating customer, needs to employ a colour-sensitive plate, and it will be found the wisest plan to adopt no half-measures in the way of the use of an orthochromatic or isochromatic emulsion, but to make choice of the panchromatic. If the full range of sensitiveness of the panchromatic does not happen to be called for the result is none the worse, whilst if the original is of a kind which demands sensitiveness in the red as well as in the green, the results on panchromatics will be immensely superior to those on the less highly sensitised colour-sensitive plates. Moreover, such plates, if of the remarkably even degree of sensitiveness throughout different parts of the spectrum possessed by the new Ilford panchromatic, simplify the work of the copyist and render it easier to achieve results in the way of producing surprisingly good copies of prints which have become badly yellowed. We mentioned at the outset that the yellowed print really comes in the category of a coloured original, for the reason that the non-actinic hue of the ground causes it to photograph much darker than it looks. With a panchromatic plate it is caused to photograph more in accordance with its visual appearance, and by the use of a suitable filter the stained ground may be reproduced in the print from the copy negative of any required degree of whiteness. The panchromatic plate also has a special interest for the copyist in the degree to which exposures on originals of highly non-actinic colour may be reduced, even when employing comparatively feeble artificial illumination.

THE PREPARATION OF PRINTS FOR COLOURING.

ARTISTS when they first attempt colouring of photographs appear always to think that a special preparation is necessary in order to enable the colour to hold. The idea no doubt is fostered by the crystoleum process, in vogue years ago with its entirely special procedure. But it will be seen from the following notes that only a few papers—those of the glossy variety—require special treatment. It is the custom of some workers desiring to use these papers to destroy the glossy surface by means of abrasives in order to apply the colour. This is trouble for nothing: it cuts up detail and spoils the charm of the print: with the same amount of time and by the use of a suitable medium, better results can be obtained. The surface of the paper is a great help in any species of colouring: a fine egg-shell grain affords a "tooth" holding and breaking the colour: paper of coarse grain exerts this effect too much, whilst one of smooth ivory surface is no help at all. In the case of tiny miniature prints it is necessary to use a very smooth surface, whilst for large work paper of coarser texture is equally necessary. It requires to be remembered that when using water-colours on a pure linen paper the paper is not merely a surface but an aid in the colouring up to a certain point. Thus the degree of sizing, the grain and the weight of the paper, may be helps or hindrances according to circumstances. For example, a hot-pressed Whatman paper is nearly as bad as ivory-matt bromide when one is putting on a second wash of water-colour, and as photographic papers as a rule do not permit of the colour sinking in, there is only one course left and that is to build up the colour by stippling, that is to say if the worker has not got an aerograph at his disposal. Prints should be mounted before colouring, as that materially adds to the comfort of working. Another hint is to make all the necessary preparations beforehand. Whistler painted his pictures on his palette in the first place, that is he mixed the flesh, hair, dress, and background colours first and when all was ready laid them cleanly on his picture.

Before dealing with the different methods of colouring it may be useful to give one formulæ for a medium which is of general service and is very easily prepared.

Ox-gall, 20 drops; methylated spirit, 1 oz.; water, 1 oz. Manufacturers of artists' materials are able to use industrial spirit, which makes a clear solution, but although the above, when made with ordinary spirit, is milky, this is no objection to its all round usefulness with water-colours, dye solution, for thinning moist colours in tubes, for use with the aerograph, and for mixing suitable tints for spotting purposes; also for dissolving small quantities of raw dye instead of in hot water.

Colouring with Dyes.

Prints, whether gelatine, matt collodion or ordinary or Japine platinum, require no preparation for dye colouring. For P.O.P. and bromide, either matt or glossy, damp the print all over to enable the first wash to run evenly. Dyes only stain papers of gelatine surface: from others, such as matt collodion, they wash off like ordinary water-colours. In dealing with glossy collodion papers the best plan is to apply a varnish of strong artists' gum. This will prevent small cracks and fissures. As a further aid to colouring glossy collodion prints, with dyes the ox-gall medium just mentioned above may be used or the mixture of albumen and vinegar given in the last paragraph. If it is found that the work affects the gloss of the print. the latter can be polished with a mixture of wax and turpentine.

Another mixture which is useful in colouring glossy collodion prints with dyes is:—Methylated spirit, 2 parts; acetone, 1 part. A few drops of this mixture, added to each wash, is all that is required, but the previous application of the gum varnish is a more reliable method.

Water Colours.

What has just been said in regard to dyes for the various classes of prints applies also to water-colours, except that with glossy gelatine prints it is necessary to give a preliminary rub over with ox-gall. This is the universal medium for use with water-colours. The specially prepared and purified artists' ox-gall should be used, but with experience it will be found that it is necessary only if the paper is greasy or of considerable gloss.

For large work, such as 20 x 16 inches, on a smooth paper, a useful method is to apply fine pumice powder with a tuft of wool, then removing it with a duster or dusting brush. This gives a "tooth" for holding the water-colour wash. A 10 per cent. solution of formaline may be used for the same purpose. Merely moisten a sponge with this solution and rub lightly all over. This treatment removes any paste marks (which soon show up with aerograph work and always appear darker than the surrounding part of the print), hardens the film and makes the gelatine less slippery. When colouring lantern-slides, especially with a worn and stiff brush, this formaline solution is very helpful. The slides are simply allowed to soak in it for ten minutes, and are then well washed.

Another formula which is useful with water-colours is:—

Higgins mountant, 1 part; water, 2 parts.

This will give a dead matt or gouache effect to water-colours and adds a certain body to the colouring by dyes. It works well and is not so apt to lift if repeated washes of colour are required in building up the picture.

Oil Colouring.

As a general rule prints of matt and semi-matt surface, whether gelatine, collodion, or platinum require no preparation for oil colouring, but as the colours appear to sink in it is best to dissolve a pennyworth of good quality size from the oilshop in 20 ozs. of hot water, to brush this evenly over the print, then setting it aside to dry. If too thickly applied it peels off with the colours in the course of time.

Instead of the size, prints may be varnished with a mixture of Japan gold size, 1 part, and turpentine 3 parts. The advantage of this mixture is that one can start work at once.

Where the surface of a print is soiled, a thin coat of any starch or gelatine mountant is helpful before starting the oil colouring.

Some workers prefer to prepare the print by rubbing over artists' drying oil applied with a soft rag, then allowing 24 hours for the coating to harden.

This leaves a very pleasant surface for working on and is essential for the colouring of glossy, gelatine, or collodion prints.

Crayon, Powder, and Pastel.

Glossy prints, whether gelatine or collodion are totally unsuitable for this method of colouring. Matt collodion prints and ordinary or Japine platinum require no preparation, but with matt or semi-matt gelatine prints it is necessary to prepare the surface with pumice or cuttle-fish powder. Fine pumice powder should be applied with a pad of cotton-wool and removed with a broad dusting-brush. For small prints, cuttle-fish powder is better. The 18th century method of using pastel thinly is preferable on prints, but where a thick oil-painting appearance is required, the print should be damped all over and then a wash evenly applied of diluted Higgins' mountant. While this is still wet, pumice powder should be dusted on and left to dry.

Only the very soft French or Rowney pastels are suitable. The hard, semi-hard, and wax varieties sold for the use of children are useless.

Inasmuch as any degree of shaking or the merest touch will detach the fine particles of pastel powder it is advisable to fix the work with a hot solution of pure gelatine by means of a spray diffuser; or the gelatine solution can be applied by straining a piece of thin nainsook over the pastel work and lightly and rapidly brushing the gelatine solution through it. Shellac dissolved in alcohol gives too much transparence to the work and darkens in time. A further fixative which has less lowering effect upon the high-lights is:—

Celluloid	7 grs.
Amyl acetate	3 ozs.

Film clippings free from emulsion can be used. The celluloid is dissolved by shaking and requires to be kept in a tightly corked bottle. It can be applied with a spray diffuser but an oil atomiser or the aerograph gives the best result.

For charcoal, powder, and pastel in the way of fixing and deadening the shine of pencil work the following is useful:—

Beeswax (cera alba)	$\frac{1}{4}$ oz.
Carbonate of potash	12 grs.
Water	1 drm.
Carbon tetrachloride	2 ozs.

First melt the wax, then add the potash dissolved in water (this saponifies the wax) and when somewhat cool add the carbon tetrachloride. This mixture is sprayed on in the usual manner, about 15 inches from the work. Some pastellists may prefer to use this to set the powder partly, finally fixing with the gelatine after the manner of Bertrand's two solution operation if they have used pastel thickly.

With all fixatives the amount used will be in proportion to its freshness; only by experience, trial, and error can one judge the mount to use.

Wax Colouring.

This method of colouring is one which is of the most universal application: in the case of every description of print it can be used without preliminary preparation. The medium for use with the colours is as follows:—

White wax	1 oz.
Turpentine	4 ozs.
Canada balsam	½ oz.

The wax is soaked in 2 ozs. of the turpentine, melted gently by heat and when somewhat cooled the balsam, previously dissolved in 2 ozs. of turps, added, and the whole well stirred.

In many ways wax colouring is preferable to oils, the colours drying quickly, more so by substituting one part benzine to one part turpentine, and permitting the work to be finished passage by passage. Thickness of colour is not necessary in order to get force and richness of effect. The white ground should be made use of as with water-colour. With experience the wax medium allows of imitation of all processes according to the skill in brush work, and whether transparent, opaque, matt or mixed method is employed. The print should be rubbed all over with the medium before commencing work; when finished, it should be warmed in front of the fire to bring the wax to the surface if a glaze is required. When dry and hard, picture varnish can be applied if necessary.

Some Other Formulæ.

Two other formulæ may be included in this chapter of prescriptions, as they can serve the colourist usefully on occasion.

The following is an old-fashioned mixture largely used years ago for deepening the shadows and for dark backgrounds, giving force to prints. It serves also for mixing with colours where a shiny gloss is wanted as is necessary in spotting on glossy papers.

Gum arabic, powdered	¼ oz.
Water	2 ozs.
Methylated spirit	60 dps.
Acetic acid	10 dps.
Sugar	1 dr.

Another formula useful when colouring lantern-slides with dye solutions, or for albumen prints and other glossy papers, also when colouring real ivory with water-colours is as follows:—

Albumen	1 oz.
Vinegar	10 dps.

The white of one egg is completely separatel from the yolk, beaten to a froth with a fork on a plate and allowed to settle for about twelve hours. It is then filtered and the vinegar added.

Burlington.

A NEW METHOD OF OBTAINING DYE-TONED IMAGES BY THE USE OF COPPER FERROCYANIDE AS A MORDANT.

(A Communication from the Eastman Research Laboratory).

Although numerous methods have been worked out for toning lantern slides and motion-pictures film by replacing the silver image either wholly or partially by a coloured inorganic compound, owing to the limited number of coloured inorganic compounds available, only a very incomplete range of tones can be obtained in this way.

It has long been considered that if the silver image could be converted into a compound capable of fixing or mordanting a dye in proportion to the density of the image this would be the ideal method of toning. Accordingly numerous experimenters have made a deliberate search for such mordants (see "B.J.," 1911, p. 607), and the first worker to evolve a practical process was Traube, who took advantage of the mordanting action of silver iodide for certain basic dyes, and obtained dye images by first bleaching the silver image to silver iodide in a suitable bleaching bath, and then immersing the bleached and washed image in a solution of the dye. When producing dye images in this way it is necessary either that the dye shall not be absorbed by the gelatine readily, or that it will easily wash out again in order that clear high-lights may be obtained.

Owing to the relatively high opacity of a silver iodide image when produced in an emulsion of average grain size, the dye image obtained in the above manner exhibits very little colour when projected, so that it is necessary to remove some of the iodide without removing the dye by fixing in a solution of hypo containing tannic acid and other salts which render the dye insoluble. If all the iodide is removed in this way the residual dye image is usually too thin for projection, though by only partially fixing tolerably good tones are obtained. The action of the hypo is, however, not proportional, attacking the high-lights more than the shadows, so that double tones are obtained.

In view of the above objections to the Traube process, experimenters have attempted to secure transparent tones directly without subsequent fixing, the most recent process being that of Miller (U.S. patent 100,098), which consists in bleaching the silver image in a mixture of potassium iodide and iodine containing an excess of potassium iodide, with a view to producing a transparent modification of silver iodide capable of mordanting in the usual way.

The following experiments are the result of a systematic search by the author for mordants other than silver iodide which would give a transparent image on projection.

The Mordanting Action of Copper Ferrocyanide.

As a result of numerous experiments it was found that an image containing copper ferrocyanide, obtained by toning in the usual copper toning bath, exerted a powerful mordanting action, and was capable of producing excellent dye images.

The usual copper toning bath consists of a solution of copper ferricyanide dissolved in a suitable solvent such as a solution of an alkaline salt of citric, tartaric, or oxalic acids, together with other salts. On immersing the silver image in such a bath the silver reacts with the copper ferricyanide and is converted to silver ferrocyanide, while copper ferrocyanide is formed simultaneously in combination with the image.

$$4Ag + 2Cu_3(Fe(CN)_6)_2 = Ag_4Fe(CN)_6 + 3Cu_2Fe(CN)_6$$

On immersing this image in a solution of a suitable basic dye a composite image is obtained consisting of a mixture of silver ferrocyanide, copper ferrocyanide, and the dye. The copper ferrocyanide may be removed from the toned image by treating with a solution of caustic soda when an image consisting of copper ferrocyanide and silver is left, and in turn the silver ferrocyanide may be removed with a 10 per cent. solution of hypo, leaving am image of copper ferrocyanide with more or less silver. On immersing the separate copper and silver ferrocyanide images thus prepared in the dye bath after well washing, only the copper ferrocyanide was found to exert any appreciable mordanting action.

The method of procedure was first to tone the silver image in the copper toning bath, wash, and then immerse in the dye bath until the desired colour was obtained. The nature of the tone was found to depend on the following factors:—

The Nature of the Copper Toning Bath.

The formula for this is given under "practical instructions." Although many of the usual formulæ for copper toning will produce a dye image, it is necessary that the toned image should be as transparent as possible so as to eliminate the necessity of subsequent fixing. The formula appended gives very transparent tones.

Nature of the Positive to be Toned.

This should be free from hypo so as to remove any possibility of the image being reduced by the ferricyanide in the toning bath. When toning in the copper bath little or no intensification takes place, though as certain dyes, such as methyl violet, are very heavily mordanted, it is necessary to choose a positive somewhat thinner than the average, according to the degree of intensification produced during dyeing. Full details are given under "practical instructions."

Time of Bleaching.

The time of bleaching determines the proportion of copper ferrocyanide in the toned image, which reaches a maximum in from ten to fifteen minutes. If only pale tones are required the image is toned for only two or three minutes in the copper bath, while if a full tone is required the copper toning is carried to completion.

Time of Washing after Bleaching.

It is necessary to wash sufficiently long for the soluble copper salts in the toning bath to be removed, otherwise the dye would be mordanted on to the high-lights and stain them. Usually ten minutes is sufficient, though prolonged washing does no harm, since the copper ferrocyanide is insoluble in pure water.

Nature of the Dyes Employed.

In general only basic dyes are mordanted, and only those which do not readily dye gelatine and which are mordanted by copper salts are suitable for toning by this method. The following dyes have been found satisfactory:—

Tannin heliotrope,
Thioflavine,
Victoria green,
Methyl green,
Methylene blue,

and the following dyes manufactured by the National Aniline and Chemical Co., Inc., New York City:—

Safranine,
Chrysoidine,
Methyl violet.

Dyes manufactured by different makers differ somewhat in their behaviour towards gelatine and towards mordants, so that it is necessary to make a preliminary trial with each new sample of dye.

Only a very weak dye bath is necessary, and this should not be stronger than 0.1 per cent. A stronger dye bath gives badly-stained high-lights, necessitating long washing to clear them, while with a weaker bath the dye is absorbed very slowly or not at all.

The Effect of Adding Acid to the Dye Bath.

The addition of acid to the dye bath has the effect of increasing the rate of dyeing in some cases and of decreasing it in others; in the case of the dyes given above the addition of acid appears to diminish the rate of absorption of the dye by the gelatine, so that by using acid a stronger solution may be employed without the high-lights being stained. If the concentration of the dye is increased to any great extent beyond the amount stated stained high-lights are obtained.

Time and Temperature of Dyeing.

The amount of dye absorbed by the image and therefore the strength of the tone varies with the time of dyeing, reaching a limit in from five to ten minutes. The time of dyeing is also slightly affected by changes of temperature, though slight changes are of no moment.

Time of Washing after Dyeing.

This varies according to the degree of staining of the high-lights and the fastness of the dye to washing. In the case of the examples below only a mere rinse in pure water is necessary to clear the high-lights, though if the high-lights are stained they may be cleared by washing in a 0.2 per cent. solution of acetic acid. Too high a concentration of acid in the wash-water should be avoided, otherwise reticulation and frilling of the gelatine is liable to occur, especially if the temperature is above 70° F.

Effect of the Size of the Image Grain on the Transparency of the Tones Produced.

The transparency of the tones is determined by two factors:

(a) The nature of the copper toning bath. The composition of the bath recommended has been so adjusted as to give the maximum transparency.

(b) The size of the silver grains of the image to be toned.

Previous investigators appear to have ignored the effect of grain size on the transparency of the toned image. Experiments were made with emulsions of varying grain size, and it was found that with lantern slide emulsions of very fine grain such as give warm tones by direct development, very transparent images were produced after toning and dyeing as above without any subsequent fixing whatsoever.

However, a toned image for purposes of projection should not be too transparent, otherwise it lacks brilliancy, so that the tones obtained on, say, the "Standard Slow" lantern slide plate and on Eastman motion-picture positive film by the following methods are satisfactory.

The dye tones recommended proved to be fast to light, no change in colour being noticeable after exposure to a quartz mercury vapour lamp for five hours at a distance of eighteen inches.

Practical Instructions for Toning Lantern Slides and Positive Motion Picture Film.

Nature of Positive.

Since the following toning processes intensify the original image, it is necessary to commence toning with an image of the correct density and contrast. A "medium," positive referred to below, is obtained by giving a slight over-exposure and a short time of development, but the exact degree of intensification which takes place in any particular case will be learned after a few trials.

In the case of lantern slides the best and most transparent tones are only produced on slides of fine grain such as the Eastman Standard Slow lantern plate.

Tone I.—Red Tone.

Positive employed: Medium.

Tone the well-washed positive in the following:—

	Avoirdupois.	Metric.
Copper sulphate	250 grs.	16 gms.
Ammonium citrate (neutral)	1 oz. 300 grs.	50 gms.
Potassium ferricyanide	240 grs.	16 gms.
Ammonium carbonate	120 grs.	8 gms.
Water to	128 ozs.	4 litres.

Dissolve each ingredient separately in as little water as possible, mix the filtered solutions so obtained in the order given, and dilute to the required volume. The solution obtained should be light green in colour and perfectly clear. The ammonium carbonate should be almost transparent and free from white powder, and should be dissolved in cold water, while the ammonium citrate employed should be neutral. Most samples contain acid, which acid would neutralise the ammonium carbonate and affect the resulting tone. The free acid is usually citric acid, and should be neutralised with a solution of ammonia, using litmus as indicator.

Somewhat warmer tones are obtained by adding 50 per cent. more potassium ferricyanide to the formula.

With use the bath precipitates a brown sludge of copper ferrocyanide, and in consequence becomes weaker by the loss of copper.

Time and Temperature of Toning: 5 to 15 minutes at 70° F.

Time of Washing: 10 minutes.

It is important to keep the bath covered when not in use so as to exclude light, since the bath is light-sensitive, while no foreign metallic surface should be allowed to come into contact with the solution, otherwise the copper salt will deposit on the metal.

After washing immerse in the following dye bath:—

	Avoirdupois.	Metric.
Safranine A (National Aniline and Chemical Co., Inc.)	60 grs.	4 gms.
Acetic acid (glacial)	2/3 oz.	20 c.c.s.
Water to	128 ozs.	4 litres

Time of Dyeing: 5 to 10 minutes, according to depth of tone desired.

Time of Washing after Dyeing.—Usually only a slight rinse in water is necessary. If the high-lights are stained the positive should be washed for five or ten minutes, or until clear. Stained high-lights are caused either by insufficient washing after toning, too strong a dye bath, or an incorrect amount of acid in the dye bath.

Tone 2.—Orange Tone.

The instructions are exactly as for Tone 1, substituting the following dye bath:—

	Avoirdupois	Metric.
Chrysoidin 3R (National Aniline and Chemical Co., Inc.)	24 grs.	1·6 gms.
Acetic acid (glacial)	2/3 oz.	20 c.c.s.
Water to	320 ozs.	4 litres

Tone 3.—Violet.

The instructions are exactly as for Tone 1, substituting the following dye bath:—

	Avoirdupois.	Metric.
Methyl Violet (National Aniline and Chemical Co., Inc.)	24 grs.	1·6 gms.
Acetic acid (glacial)	2/3 oz.	20 c.c.
Water to	128 ozs.	4 litres.

Intermediate Dye Tones.

The depth of the dye tone is determined by the time of immersion both in the copper toning bath and in the dye bath. Pale tones may therefore be obtained either by giving a short bath in the copper solution and fully dyeing, or by toning for a longer time and giving a short immersion in the dye bath.

By mixing the dye baths 1, 2 and 3 intermediate colours may be obtained.

Tone 4.—Pale Red.

Positive Employed.—Normal: Tone for one to two minutes in the copper bath, wash for ten minutes, and then immerse in the following dye bath:—

Dye solution for Tone 1, one volume.
Dye solution for Tone 2, one volume.

When the desired tone is obtained rinse until the high-lights are clear.

Compound Tones—Tone 5—Copper, Iron, Dye Tone.

By first partially toning the black and white positive (medium) in the copper bath so that the half-tones are completely toned, but the shadows only partially, washing for ten minutes and then completing the toning process in a blue toning solution, the residual silver in the shadows is toned blue. In this way a double tone is obtained, the shadows appearing dark blue and the half-tones reddish brown.

By immersing the positive toned in this manner in the chrysoidin dye bath, as given under Tone 2, the dye is mordanted to the half-tones which contain copper ferrocyanide, producing a striking double tone effect.

A suitable blue toning bath formula is as follows:—

	Avoirdupois.	Metric.
Potassium bichromate	1 1/2 grs.	0.1 gms.
Ferric alum (Ferric ammonium sulphate)	75 ,,	5 ,,
Oxalic acid	180 ,,	12 ,,
Potassium ferricyanide	60 ,,	4 ,,
Ammonium alum	300 ,,	20 ,,
Hydrochloric acid 10 %	65 minims	4 c.c.s.
Water to	128 ozs.	4 litres

The method of compounding this bath is very important. Each of the solid chemicals should be dissolved separately in a small quantity of warm water, the solutions allowed to cool, filtered strictly in the order given, and the whole diluted to the required volume. If these instructions are followed the bath will be a pale yellow colour, perfectly clear, and will remain so for a considerable period.

Troubles in Dye Toning.

A. Stained high-lights are due either to insufficient washing after toning in the copper bath, too strong a dye bath, or an incorrect amount of acid in the dye bath.

B. Weak high-lights. If the high-lights do not absorb the dye proportionally, this is due to the use of an exhausted copper bath or of one that was not mixed correctly.

Summary.

Lantern slides and motion-picture positive film may be toned by replacing more or less of the silver image by a compound of copper, particularly copper ferrocyanide, washing, and then immersing the toned image in an acid solution of a basic dye. The copper salt present in the image acts as a mordant to the dye, and a toned image is thus produced of a colour intermediate between that of the dye and the copper compound, depending on the relative proportion of each. The amount of the copper salt necessary to mordant the dye is usually so small that the resultant tone differs but slightly from that of the dye itself.

By employing a mixture of dyes intermediate tones may be obtained, while by commencing with a black and white image of fine grain very transparent toned images are produced.

The author is indebted to Mr. S. Tulpan for assistance in carrying out the various experiments. J. I. CRABTREE.

TRIBUNAL APPEAL.—At Scarborough a professional photographer, Grade 2, stated that before he entered into his present responsibilities he was told by the military, after examination, that they would have no need for him. He had been called up for August 1. That meant his closing his studio in July to get through his business by August 1. It was really the opening of the Scarborough season, upon which he was dependent for getting his rent and rates. He also pointed out to the area tribunal that a Russian photographer had been before the local tribunal and they could not touch him. Was it fair an alien should be allowed to stay in the town and that he, in the same business, should have to give up and join?

The Chairman: We cannot go into that.

The National Service representative said he agreed that it was in consequence of a letter from Major Boyce, then the recruiting officer, that this man took larger premises.

The certificate of exemption was varied to September 30, final.

ADVERTISING THE SMALL STUDIO.

[A theme which has frequently been the subject of notes in our pages, but is one which is constantly worth the notice of photographers in smaller towns is considered in the following article by Mr. J. Clyde Wilson, which we quote from "American Photography." A good deal of money can be spent in advertising without half the profit which may accrue to a studio by a photographer's friendly interest in the doings of the various organisations around him.—Eds. "B.J."]

Probably no business force is so utterly misunderstood as advertising. In spite of its many successes, we are still very much in the dark concerning it. The trouble seems to be we have expected a little too much of it. Seeing what appeared like very simple ads. piling up great fortunes for the advertisers, we concluded it was a very simple matter, and that we could do just as well ourselves with a little practice. Forthwith we set out with pencil and pad to set the world on fire. But after our pet ads. had appeared and we came to count up the receipts—if, indeed, there were any receipts—there came a great disillusionment, and we reached the conclusion that advertising did not pay. I suppose nearly every merchant at some time or other has had some such experience. This dream of a new Eldorado is almost as common a human experience as is the buying of gold mining stock which every unsophisticated individual experiences sooner or later.

One cause of these initial failures is doubtless a too sanguine faith in the pulling power of mere words. Of course, copy is important—very important—but of even greater concern to the advertiser is the plan behind the copy. No two business propositions are quite alike, even though of the same line. Each has a definite territory, or a particular clientele, or a particular marketing plan which makes its advertising problem different. One studio, for instance, to bring the matter home, may have a reputation of cleverness in photographing children; another may do work of an ultra-exquisite kind, for which high prices are charged, which only a very wealthy class can afford; a third may be located in the residential section of the town and have to be governed in its output by the demands and financial status of its environment. Now each of these studios will find some particular kind of advertising more effective than another. The exclusive studio, for example, could not use coupons or premiums, would have to use engraved stationery, and would have to make its appeal in a very subtle and not too brazen way. The studio in the foreign settlement, on the other hand, might very well give an enlargement with each order or offer other inducements. The centrally located studio might even advertise in the newspapers, a course which would be decidedly unprofitable for a studio out of reach of four-fifths of the population. In advertising, as in everything else, it is always wise to follow the way of least resistance. Advertising which seeks to change the public's customary habits in buying must overcome a tremendous resistance. An outlying studio, therefore, is foolish to spend money to reach people at the other end of town on the theory that they will cross the city to visit the place. But the central studio is wise in trying to reach everybody, because everybody who has money to spend comes its way.

In planning an advertising campaign one ought to have a definite purpose in mind—ought to know in advance just what he expects to accomplish by his effort. We do not always do that. We "take a flyer," as we say, hoping something will come of it, but not knowing just what we have a right to expect. This kind of spasmodic advertising is not usually effective, and it is the wasteful kind, that is so very common—the kind that brings the disillusionment. You can see at once why it is so. Each day's mail brings to you two or three pieces of advertising matter. Do you become "het up" over them, grab your hat, and rush to the advertisers' places of business to purchase the goods they told you about? You do not. To secure immediate action, if that is what you want, there must be some powerful inducement. If your ad. says that the first ten customers answering this ad. will be presented gratis with a 14-carat gold watch, you would spring out of your chair like a jack-in-the-box to answer it, especially if the place was near and a gold watch was what you had always wanted. Self-interest is the most powerful incentive to action, and that is the key to premium advertising. It is an artificial stimulus of trade. If we can get something for nothing worth while, defeating the positive law of compensation, which we know only too well demands that we labour for all we attain, we are willing to spend the little effort required to meet conditions.

But all normal growth is slow; nothing that is at all long-lived grows to maturity in a day. And this law, which is true of plants and animal life, is true of business. And even advertising cannot build business for you in a day, except in an artificial and costly way. So in planning your campaign you must expect to use one of these two kinds of advertising effort. You can either advertise for immediate results by inducements, or you can prepare for business growth by constant persevering effort. The latter method is invariably better in the long run, and sometimes you can combine the two. For instance, a little inducement advertising at a dull time is worth while, and department stores have made it a great dull-season trade stimulator. You will recall the January white sales, the midsummer clearances, and so on. But you ought to know what to expect of each kind.

It is said that if you take a small hammer and begin a steady pounding on the mightiest wall, in due time the wall will crumble before you. It is difficult to resist persistent, steady effort. I fancy any general would tell you that, though a great charge may break through the lines, a steady, consistent effort, persisted in long enough will certainly do it, unless the resistance is planned along similar lines. The laws of advertising have not yet been very scientifically defined, but there are laws just as surely as there are laws governing every human action. One thing we have discovered is that the effect of advertising is cumulative. That repeating your message over and over again to the public impresses it subconsciously upon people's minds, and when there is occasion to use a product such as you have been advertising, your message comes to mind without conscious effort. In school you will remember when you were learning to spell you spelled over the words a number of times until they had set, as you might say, in your memory. That is what is presumed to be accomplished by cumulative advertising effort. And this kind of advertising pays because it becomes a part of the individuals reading it, as you might say. It cannot readily escape them. On the other hand, spasmodic advertising, such as an occasional inducement, must be acted upon at once while the thing is fresh in mind, or it is a failure, it is not likely to be thought of again.

The first thing the advertising man asks his client is, "How much are you going to spend?" It is an important matter, because if you can only spend a little the effort must be of a very different kind from what it would be if several avenues of approach were possible. In any event, every dollar must be made to count. And that is why the small studio has a particularly difficult advertising problem. The amount at its disposal, if kept within reason, is too small to do much advertising along conventional lines. Appropriations are usually figured as a percentage of the previous year's business. This per cent. varies from a fraction of 1 per cent. to 5 per cent. ordinarily. There have been cases, however, when the amount has been much greater. The small studio cannot well afford much more than 5 to 8 per cent., and I think usually some scrimping would be necessary at that. It must be remembered that, barring inducements, the effect of this expenditure will not show for some time. Perhaps by the following Christmas you will see many more customers than usual. There is no way of tabulating the increase. There will be an increase, but just what part of it is normal growth and what part advertising has helped to bring in cannot be exactly stated.

If we cannot expect to do much advertising along the conventional lines profitably, are there any other kinds of advertising we can do to accomplish the same purpose? In answering this question let us ask ourselves just what is meant by advertising? We usually think of it as something printed, a sign, a car-card, a space display in the paper. But advertising should really be looked upon as any means of acquainting the large public with your opportunity to serve it. That it is not always printed matter you will at once realise when recalling a clever advertising slogan: "We are advertised by our loving friends." The word-of-mouth testimonial is said to be the best advertising in the world. It is direct and spoken, it has the assistance of the human voice to give it plausibility and to lend suasion to it. You know yourself that you are quicker to patronise an advertiser who has come recommended, even by a stranger. The small studio is particularly fortunate in the opportunity that is usually presented to it to get close to its patrons. They live áll about it, or not far away. If it is in the street where they trade, they have a chance to pass it by frequently, look into its windows and to know the kind of work it does. In other words, the introduction is already accomplished, a thing many big advertisers would give a great deal for. Witness how much is spent by many of them in distributing samples and in demonstrations, just to secure this introduction.

It is quite clear, then, why the small studio ought to be located where it can be on the ground floor and have plenty of attractive window space. But even with a good window your work will not attract everybody and instil a desire for pictures. Some kind of suasion must be exercised. An effort must be made to create a want on the part of the public. The first step in this kind of advertising is to find a way of constantly reminding people of pictures and of your service. One way is to know as many people personally as possible. You will not need to talk pictures with them; curiosity will soon bring them a knowledge of "what you do for a living." Of course, you will meet many people in a casual way if you are in business long in a neighbourhood. But it is worth your while to go a little further and seek ways to increase this acquaintance. Can you not find some point of contact by which you can have a chance to rub elbows? Most likely, if you try.

In the first place, do you know thoroughly the territory you serve? Do you know how many churches there are in it, how many schools, how many factories, how many laundries, how many clubs, how many hospitals or how many theatres? You ought to have a list of them to study over, and then you ought to take each one separately and ask yourself how you can manage to get into touch with it.

There are several churches in your territory. How can you reach the churches? A large picture of Christ, a copy of some famous work, such as Hoffman's "Christ in the Temple," will be gladly received by the parish if you call on the pastor before taking action and tell him you would like to make the church this gift, an example of your craftsmanship, to hang in the Sunday-school room. The whole church will soon know about that, for I fancy the pastor will make announcement of it from the pulpit. Then everyone will say, "That's that little photographer over on the Avenue. Wasn't that nice of him? He does awfully good work." Is not that advertising?

The Ladies' Knitting Society, you read in the paper, is meeting every Thursday at the Red Cross to make scarfs for the soldiers. Mrs. Drabyarn is president. You must see Mrs. Drabyarn and tell her you heard they were knitting for the boys over there and you thought them very patriotic. You would like to picture them at work and display the picture in your window. Would she allow you to do so? You would distribute copies to each one present. Well! Well! A little publicity for the ladies right on the Avenue, too! Would she? Cannot you hear her telling the ladies the photographer—that fellow over on the Avenue—wants to take their picture to put in his window." "It was such a clever idea! AND HE'S AWFULLY NICE" Be sure you are. Is not that advertising?

You need not be told how to interest the schools. Photographers have not been slow in seeking this kind of work because its value has long been recognised, and it easily offers an introduction to the whole community through the young people. You know out of experience that this is splendid advertising.

The point to this story is that advertising is simply keeping people informed and interested in your work. The photographer who is always bobbing up in every community gathering keeps people constantly thinking about pictures. Circular advertising approaches people individually, whereas the suggestions herein related make their appeal to groups, which has some advantages. In a crowd personal preferences are buried and the individual endeavours to sacrifice personal desires to effect a unity with the group. In this way it is easy to secure endorsement, for it is the tendency of the crowd, unless provoked, to be optimistic and positive in temperament. It is fallow ground for advertising. Nobody wants to be a kicker and a crab in a crowd that is inclined to be agreeable.

Along with this personal effort the small studio can use a little advertising in the local paper if there is one and it is of a kind that people look forward to. In fact, not to do so is to lose the opportunity to be considered loyal to that section—the group consciousness again.

Coupons as inducements or premiums are of course valuable because the investment is always pro rata to the returns, but it is not publicity of a confidence-inspiring kind. A good letter occasionally under three cent postage will help, especially if followed up. But the trouble is the small studio has too limited an appropriation to circularise much of a list in this way often enough to secure much advantage. As for booklets, they go into the basket as a rule, and if not followed up are little better than occasional letters. And they cost a great deal more. The logical advertising for a small studio is secured by getting into the limelight personally

J. Clyde-Wilson.

New Books.

Optics for Photographers. By Dr. Hans Harting. Boston: American Photographic Publishing Company. Price 2 dollars.

This book is a translation by Mr. F. R. Fraprie of the German text-book by Dr. Harting, of the firm of Voigtländer, issued in 1909. As its title indicates, it is more than a book on photographic lenses, although the optics of the photographic lens is its subject proper. But here the student is given, by way of introduction, a fair insight, so far as is possible without more than the most elementary mathematics, into the optical phenomena of reflection, refraction, and absorption of light, and is thus provided with a reasonable groundwork for the more intelligent appreciation of the application of these phenomena in the design of photographic lenses. Dr. Harting's work thus occupies a midway position between the purely practical text-books on photographic optics, such as we have been chiefly familiar with in this country, and the mathematical treatises on the subject which are the reading only of the professional optician. Such a scope for a volume makes it a difficult one to write, but it may be said that the author has been successful in presenting a graphic and at the same time comprehensible view of the scientific optics of the photographic lens as distinguished from the use of lenses in practice. Where he comes to historical matters he is less satisfactory. For example, in the chapter on the telephoto objective the only mention of Dallmeyer, wrongly cited as "F. R." instead of T. R., is in reference to the introduction of the Adon lens. The reader of this chapter might be excused from assuming from it that the work of the late Mr. Dallmeyer was a mere supplement to that of Zeiss and Busch, as represented by the telephoto lenses of fixed focus introduced by these makers. Perhaps an error of this kind would have been passed without comment years ago, but nowadays one has become accustomed to discovering in some sections of German technical literature a tendency to ignore the work of a non-Teutonic pioneer, and even to misrepresent it to the degree evident in the example we have just referred to. It should be added that Mr. Fraprie's work of translation appears to have been very conscientiously carried out; he, of course, is not responsible for the views of the German writer, although he might quite reasonably have supplemented his work of translation by a few editorial corrective comments.

How to Make Lantern-Slides.—A first-rate little manual on the making of lantern-slides forms No. 7 of the "Practical Photography" series issued by the American Photographic Publishing Company, 221, Columbus Avenue, Boston, Mass. It deals thoroughly with the making of slides on gelatine plates by contact and by reduction, with the production of diagram slides, and with the making of slides on collodio-bromide emulsion and by the carbon process.

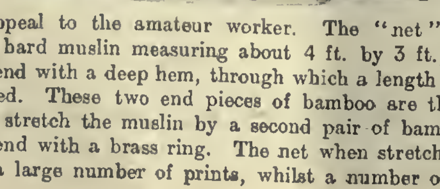
Hints on combination printing in lantern-slide work, together with a full series of formulæ for toning, intensification, etc., complete an altogether excellent manual, which is published at 35 cents in paper covers or 75 cents in cloth-bound covers.

Cloud Photography.—In these days of warfare it is a far cry to the photography of almost the only part of the planet which is left wholly unmutilated by the military engines of destruction. In the heat of a world war Editor Tennant thus provides a refreshing interlude in the series of "Photo-Miniatures" by devoting an issue (No. 170) to the photography of cloudland and sky. The monograph deals with its subject from beginning to end, giving full instruction in the making of cloud and sky negatives, and dealing with equal comprehensiveness with their embodiment as part of the composition of a print or enlargement. The little volume, which is embellished by half a dozen very excellent examples of different types of landscape in which the sky is a feature, will be given a welcome place upon the shelves which accommodate its numerous predecessors. It is obtainable only by direct application to the publishers, Messrs. Tennant and Ward, 103, Park Avenue, New York, price one shilling, in British postage stamps or international coupons.

Camera Making.—There are, of course, amateur woodworkers to whom the making of their own photographic apparatus presents an enjoyable occupation for leisure hours, but we should be guilty of misleading even the practised woodworker, but still more the class of our readers who have only the ordinary handiness with tools, if we allowed them to believe that they could equal the convenience and efficiency of the factory-made camera, even at an expenditure of time and trouble greatly out of proportion to the cost of the apparatus at the present enhanced prices. Nevertheless, our correspondence shows that there is quite a sprinkling of photographers for whom the making of apparatus has a great attraction. These will appreciate the very practical series of chapters contained in the volume "Camera Making," edited by Mr. Bernard E. Jones and published by Messrs. Cassell, price 1s. 6d. net. It is very fully illustrated with something like 250 diagrams, and provides quite specific working instructions in the making of cameras of various types. Among these latter are the very simplest forms of a stand and a hand camera, an instrument of the hand-stand pattern, a vest-pocket and a reflex camera, as well as one for stereoscopic work. Other chapters deal with the making of dark-slides and film-pack adapters, with the mounting of lenses, and with the construction of the less complex forms of shutter. In this series of instructions, the practical character of which is sufficiently attested by the name of one of the joint authors, Mr. A. Lockett, the amateur will find all the hints he wants on the design of the apparatus, the making and fitting of accessories, such as finders and levels, and the use and purchase of the necessary brass fittings.

New Apparatus, &c.

A Drying Net for Prints.—Messrs. John J. Griffin and Sons, Limited, Kemble Street, Kingsway, London, W.C.2, send us a portable print-drying net suitable for the use of professional photographers, and, by its portability when dismantled, possessing an equal appeal to the amateur worker. The "net" consists of a piece of bard muslin measuring about 4 ft. by 3 ft., and provided at each end with a deep hem, through which a length of bamboo can be slipped. These two end pieces of bamboo are then held apart so as to stretch the muslin by a second pair of bamboos, provided at each end with a brass ring. The net when stretched will accommodate a large number of prints, whilst a number of duplicates of the appliance can be readily hung one below the other so as to provide for a very considerable output. The price of the net, complete with the bamboos, is 8s. 6d. to retail purchasers; 6s. 6d. to professional photographers.



Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Tuesday, August 13.

Hackney Photographic Society. Items of Interest by several Members.

CROYDON CAMERA CLUB.

Mr. B. J. Rose gave a practical demonstration on "Pinhole Photography," in place of the President's promised discourse on "Steam," unavoidably postponed only three times, and yet the secretary rampages.

Now the ingenious and mechanically-minded Mr. Rose is, so to speak, a photographic infant, and it became evident that the past history of a subject, latterly neglected, had largely escaped his attention. It is quite an interesting one, and allusion to a few points may be allowed as an introduction. Of course there exists the usual disagreement on some fundamentals, but all agree that the pinhole must not be in the nature of a tube, though discordant opinions are expressed as to whether for any particular size hole there is a definite distance from the plate for best definition. Some allege such wide latitude as to practically discount any "best distance" at all, whilst others contend the reverse. Possibly, much depends upon the care exercised in the construction of the pinhole, for with an imperfect one, giving poor definition at any distance, appreciable differences would not be observed by shifting it largely away from the calculated best position. Mr. J. Combe, in a long and highly instructive article in "Photography" of July 4, 1903, illustrated by wonderful examples of pinhole definition, says that when copying, enlarging, and reducing, calculations for the right size pinhole for the distance demanded require considerably more accuracy than for ordinary work, as might be expected, and the general tenor of his writing is to lay stress on using pinholes of the right size for varying distances from the plate, though he admits a fair amount of latitude in landscape work.

With very small apertures diffraction, and reflections from the walls of the hole, step in to mar sharpness, but Mr. T. Bolas has stated that when the length of the "tube" is reduced to as nearly nothing as possible, true diffraction is quite negligible, even when pinholes as small as 1-400th of an inch are used. Later, Dr. Hauberriser finds himself unable to confirm Mr. Bolas's statement, that if the pinhole is made in very thin metal, the degree of definition can be greatly increased by using a hole very much smaller than is generally recommended. Interchange of views of this description are cheering to those desirous of guidance. However, most will think they will not be far out if they adopt the table in the "B.J. Almanac," due to Mr. Watkins, and the pinhole enthusiast, Dr. D'Arcy Power, with the rules given for exposure.

So early as May, 1898, Mr. G. E. Brown is discovered expounding on pinholes, *inter alia* with an intimation that exposures vary as the square of the diameter of the hole, and also inversely as the distance of the hole from the plate. This is so obviously true on paper, as, in all probability, to be appreciably incorrect in practice. Experts in pinholes have stated that views in dull lights, compared with brightly-lit scenes, require far longer exposures than their relative luminosities indicate. Consequently it follows that if we dim the light on the plate by increasing the distance of the pinhole from it, more exposure may be required than is indicated by an estimate based on its diameter and distance. Further complications are introduced by the use of fast and slow plates which are sensitive to whispers of light not in proportion to their respective speed numbers; slow plates, speaking from memory, being deafer than fast to equivalent exposures. It is comforting to think that platemakers level-up things by imparting latitude to the emulsion, provided sufficient exposure is given to bring it into play. A most useful characteristic, which, by the way, if alluded to before a self-proclaimed and proud precisionist shows a singular want of tact. Rather express admiration for a marvellous judgment securing exactitude in exposure, and any small loan desired is safe.

Among the curiosities of pinhole life may be mentioned the telephoto arrangement devised by Dr. D'Arcy Power, consisting of an adjustable negative lens behind the pinhole. Here, paradoxically, an image is formed with only a negative lens in front of the plate. The square pinhole of M. Malvezin (described by Mr. Combe in the article referred to) presents no difficulty in construction, and the essentials for best definition—knife-edges without any burr—are easily obtainable. In the simplest form he fashions the square hole with four strips of copper foil fastened to cardboard by seccotine, each strip being mounted just in contact with a needle (set vertically in a cork) protruding through a table on which the adjustments are made.

Regarding the materials used, brass, copper, silver, and even black paper, and the many ways of making the apertures, much has been written. Mr. Rose employs sheet brass, and adopts the well-known plan of punching without penetration a conical depression, and then wearing down the apex with a stone to extreme thinness. The point of the needle is then inserted, twiddled round, withdrawn, and the burr on the brass removed with a stone, the operation being repeated until the aperture is of the right size. He dulls the metal with sulphur fumes, but did not speak enthusiastically of this method. For moderate extensions he had found a diameter of 1-50th of an inch very suitable. Several "pinhole" prints showing quite good definition were passed round, including a few due to his son "somewhere in France": in quality these knocked the parental pictures sideways.

In the discussion Mr. J. Keane asked an apparently pointless question as to the position of the pinhole relative to the front of the baseboard of a Sanderson camera utilised. No one understood what he was driving at, and various specifics for mental disturbances were sympathetically suggested. But there was method in his madness, for eventually it transpired that a streak of opacity in one negative, in the nature of a flare-spot, probably owed its origin to the upper edge of the pinhole reflecting on to the plate the polished wood of the baseboard in advance of it.

So far as recollection goes, few, if any, have advocated the use of a hood for the pinhole, but Mr. H. G. Johnson said that trials with and without a hood, had demonstrated its real utility. In one case, when some stereo-photographs were being taken at Vancouver, the pinhole pictures compared favourably with those taken with an anastigmat. Mr. E. A. Salt said the good definition afforded by a well-made pinhole was highly interesting. A weak spot was the blackening of the aperture; many recipes had been given, but few appeared to be satisfactory. For experimental work he suggested blackening with the smoke of a candle, passing the hole a few times rapidly over the smoky flame to avoid unduly heating the metal, which would burn the deposit off. A friend had suggested a solution of sulphur in caustic potash as good for dulling silver foil. Mr. F. C. Reynolds said a feature of pinhole photography appeared to be the absence of any pinhole, pins never being employed. A most hearty vote of thanks was accorded Mr. Rose for a capital practical demonstration.

News and Notes.

Messrs. Unger and Hoffmann, dry plate manufacturers, a Dresden-Berlin joint-stock company, recently (according to the "Optician") held a general meeting, at which the dividend to be paid this year was fixed at 12 per cent., as compared with 4 per cent. only in the preceding business year. The president stated that so far the sales this year had been considerably higher than those noted for the corresponding period of 1917.

Royal Photographic Society.—The Honorary Fellowship has been conferred on Professor William Jackson Pope, M.A., D.Sc., F.R.S., C.B.E., in recognition of his active interest in problems connected with colour photography over a number of years, and particularly for his solution of the problem of preparing the two dyes pinacyanol (Sensitol Red) and pinaverdol (Sensitol Green) in a perfectly pure condition on a large scale, to meet the urgent demands of the Allied Forces for sensitising dyes, and for his discovery of a valuable new class of sensitising dyes, of which Sensitol Violet is a member.

Cementing Film Negatives to Glass.—To assemble film negatives on a "flat," as the plate glass support is called in process work, J. I. Crabtree, of the Eastman Kodak Research Laboratory, suggests that the celluloid side of the film can be attached to the plate glass support by what is sold as "Major's Cement," which is made by dissolving gelatine in glacial acetic acid. By warming the acid slightly it will take up an equal weight of gelatine. If the solution is too thick it should be thinned with acetic acid. A little of this cement is attached to the corners of the film, and when it is tacky the film is pressed into position on the glass. This idea will be of service to rotary photogravure workers, for from the assembled flat of film negatives they can print the positive required for their work.—"Inland Printer."

Breach of the Closing Order.—At the Derby Borough Police Court last week John Francis Bryden, photographer, who carries on a business under the name of "Stickybacks," at St. Peter's Street, Derby, was summoned under the Defence of the Realm Act for keeping his shop open after hours on June 27.

Inspector Spriggs spoke to seeing a young man and woman enter the defendant's shop about 8.20 p.m. on the date in question. Later he saw defendant standing on the doorway of the shop, and the door was open about a foot. Witness informed defendant that he had committed an offence, whereupon the defendant said: "Go in; you can get all the information you want." Upon going inside the shop witness saw the man and woman examining some photographs, and the defendant's wife replied that she was only disposing of them. Defendant told witness that he wanted a case, and he ought to have a better job than the one he had and further he added: "Take it down to the Town Hall, we will make a test case of it." The young man remarked that he wanted to send the photographs to Ireland to be used for the purpose of obtaining a passport.

Mr. Flint, for the defence, pleaded not guilty, and described it as a trifling and piffling prosecution, urging that in view of the fact that the photographs were wanted for the purpose of obtaining a passport for Ireland no harm had been done by supplying them after hours.

The Bench considered there was no evidence to justify the allegation that there was business being done, and they dismissed the summons.

Fifth War-Time Rise in Plate Prices.—A fifth rise in the price of dry-plates, and that the greatest made during the period of the war, came into force on August 1. The rise amounts to substantially 33⅓ per cent., bringing the price of the dozen quarter-plates from 2s. 9d. (to which it was raised on February 5 last) to 3s. 8d. A dozen half-plates, according to the latest scale of prices, costs 8s., and a dozen whole plates, 15s. 3d. Moreover, even these nearly four-fold prices are accepted only in conjunction with the supply by customers to the plate-maker of used and cleaned negatives to the extent of 75 per cent. the area of new plates ordered and at prices (per gross) fixed as follows:—Postcard, 5s.; half-plate, 7s.; whole-plate, 13s. 9d.; 10 by 8, 23s.; 12 by 10, 35s.; and 15 by 12, 52s. 6d. These are net prices, and carriage is to be paid by the vendor.

It is stated that this large increase in price is dictated by the great extra cost and scarcity of glass and the expense of dealing with the waste negative glass which is now a considerable source of supply for the plate maker. As will be seen from the following synopsis, the rise is the largest made since the "popular" price of plates was disturbed just over a year before the outbreak of war:—

Successive Prices of the dozen Quarter-plates

	s.	d.
Before June 16, 1913	1	0
June 16, 1913	1	3
March 13, 1915	1	6
February 29, 1916	1	10
March 1, 1917	2	3
February 5, 1918	2	9
August 1, 1918	3	8

In reference to the latest prices discounts and carriage terms remain as before.

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Entries close September 3. Hon. Secretary, 5a, Pall Mall East, S.W.

October 14 to November 30.—Royal Photographic Society. Entries close (carrier) September 20; (hand) September 21. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

⁂ *We do not undertake responsibility for the opinions expressed by our correspondents.*

CO-OPERATIVE PLATE WORKS, LTD.

To the Editors.

Gentlemen,—The promoters of the above concern are either very simple or they take photographers generally for a set of "sawdust heads." Just imagine business men issuing a leaflet containing the following:—"Buy War Bonds and make 5 per cent. Pay these in as cash for shares and make them earn you another 6¼ per cent.—total, 11¼ per cent. You are thus supporting your country and supporting yourself—in your own business."

If this method is sound, why stick at 11¼ per cent.? Just pursue the "co-operative" idea far enough and we *might* earn 1,011¼ per cent.—Yours faithfully,

Paisley. J. DOUGLAS RITCHIE.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

T. W. D.—We have an article in type on the subject to appear within the next week or two.

L. C. LAPAGE.—We have not overlooked it; see the paragraph on another page of this issue under "Ex Cathedra."

G. T. HOLLIS.—Far better stick to the regular ferricyanide-sulphide method. You will have less trouble with that than with any other.

CHARLES CROSS.—You should certainly be able to buy from one or other of the second-hand firms at something like three-quarters the list price.

M. P. P. A.—Mr. William Gill died on February 25, 1912. He was elected president of the Professional Photographers' Association in 1910.

CURIOUS.—We cannot see any explanation from the facts as you state them. Try again with fresh chemicals, impurities in which are the most likely cause.

MASTERMAN.—The two-colour effects are evidently produced on self-toning paper by painting certain parts of the wet or dry print with salt solution, then rinsing and fixing in hypo.

D. E. HUTTON.—If it were more than a rumour we think we should have heard something of it; but it is very unlikely that a firm could find the opportunity for a new line of this kind at the present time.

GREY BROMIDES.—The trouble may be due to your negatives being too thin, or to over-exposure. A correctly exposed bromide print should stand at least two minutes' development without clouding over. Why not make a strip test, giving from 2 to 32 seconds and developing for 3 minutes? This will show whether your exposure or development is at fault.

F. F. F.—A 5 per cent. solution of ammonium sulphocyanide will clear the yellow stain from the lights of uranium-toned prints. Stronger solutions of soda sulphate and potass nitrate have been recommended for the same purpose.

VELVET.—In dissolving a substance in either hot or cold water a good deal of time can be saved by suspending it in a bag or perforated vessel at the top of the water; the heavy solution then falls and fresh water flows in to take its place, so that solution goes on much more quickly than if the solution accumulates over the crystals at the bottom of a vessel. Try a bag of coarse muslin.

NEW STUDIO.—Could you kindly let me know if it is still possible, with all the new regulations, to open a new studio? Are there any restrictions in that respect?—T. L.

By an order of the Ministry of National Service a new retail business cannot be started except by consent of the Ministry. Apply to the M.N.S., Newington Causeway, London, S.E., for a form on which to make application for permission. If the business is not carried on in the actual name of the proprietor it is necessary to register the business name under which it is conducted. A form for this purpose is obtainable at any post-office.

HAND-CAMERA LENSES.—Will you kindly give me your opinion on the following point? I have a choice of two lenses for a quarter-plate camera. No. 1 is a Beck Isostigmar, 4⅜-in. focus, f/5.8 aperture. No. 2 a Voigtlander Collinear, Series III., 120 mm. focus, f/6.8. I am anxious to use the single components as a long-focus lens. I am not quite certain if the latter can be used for this purpose. Apart from their country of origin, which is the better lens?—J. K.

We should prefer the Isostigmar, as not only has it a larger aperture, but the two lenses have dissimilar foci. In the Collinear they are both the same, and can only give a sharp image at a small aperture.

S. J. M.—There is not much object in having a dark-room larger than 10 by 12 ft., but the advantages of having one about this size are, the greater ease with which it can be heated and ventilated, and the smaller the evil effect of any stray white light gaining entrance around the door. Also the benches for developing, fixing, toning, loading slides, etc., can be conveniently kept separate with advantage to each. Also such a room allows of the enlarging lantern being used in it, and, further, with such a room, having the developing bench placed, as it should be, behind the door, the accidental opening of the latter is far less likely to do damage than in the case of a closet, where it is usually impossible to choose the position for the working bench, which in any event is close to the door.

The British Journal of Photography.

The Oldest Photographic Journal in the World.

PUBLISHED EVERY FRIDAY. ESTABLISHED 1854. **PRICE TWOPENCE.**

TERMS OF SUBSCRIPTION, POST FREE.

UNITED KINGDOM.—One Year, 10s. 10d.; Six Months, 5s. 5d. Three Months, 2s. 9d.

	One Year.
CANADA	Thirteen shillings (13s.), or 3 dollars 17 cents, or 16 francs 38 cents, or 6 roubles 15 copecks, or 9 rupees 12 annas, or 6 yens 30 sens
AUSTRALIA	
NEW ZEALAND	
SOUTH AFRICA	
UNITED STATES OF AMERICA	
SOUTH AMERICA ...	
INDIA AND FAR EAST	
CONTINENT OF EUROPE ...	
FEDERATED MALAY STATES, BORNEO AND SARAWAK	5 dollars 57 cents

HENRY GREENWOOD & CO., LTD., Proprietors and Publishers, 24, Wellington Street, London, W.C. 2.

IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as the acceptance of "returns" by a publisher is now prohibited by the Government. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 3041. Vol. LXV. FRIDAY, AUGUST 16, 1918. Price Twopence.

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SUMMARY.

Photography occupies a prominent place in the exhibition of British scientific products designed to show the progress made in displacing enemy manufactures. Raw paper base, colour-sensitising dyes, developers, micro-metric scales are among the products shown, the manufacture of which has been firmly established here within the past four years. (P. 371.)

In a contributed article are given full details of an ingenious system for registering "Cosway" borders without requiring any measurements, evolved by Mr. W. H. Smith many years ago, but hitherto unpublished. A useful modification of the original method is also described, and some suggestions are made by our contributor for applications in other directions. (P. 367.)

In selecting an outfit for professional ex-studio photography special consideration needs to be given to size and type of camera. Money can easily be wasted on lenses. We deal in a leading article with these and other points which contribute to efficient work in the varied circumstances in which such an outfit is used. (P. 366.)

The choice of either a light or a dark background, according to the character of the sitter, is the subject of an article in which Mr. Felix Raymer emphasises the value of harmony as a factor in studio portraiture and the importance of the background in this connection. (P. 369.)

The results of gold-toning sulphide-toned prints are the subject of a note of service from the Rajar experimental laboratory; the method yields some distinctive and fine tones on bromide and gaslight papers. (P. 370.)

The suggestion of a small camera for nervous sitters, the making of an anti-splash attachment, and the repair of a pneumatic release are among the subjects of "Assistants' Notes." (P. 371.)

The hardship to the photographer (in respect to business from re-orders) and to dealers in negative glass arising from the new terms of supply of dry plates is the subject of several letters. The Professional Photographers' Association anticipates that the new arrangement will need to be continued for some time to come. (P. 375.)

The work of the Photographic Section of the Royal Air Force has elicited high commendation as a factor in the success of the Franco-British offensive on the Amiens front. (P. 374.)

A rack for plates in developing tanks is the subject of a recent patent. (P. 372.)

We reply to the comments (on p. 370) of Mr. Henry Leffmann upon our recent article on print permanence, and are glad to recognise that the criticisms of our Philadelphian friend arise from a misinterpretation of the objects of our notes. Mr. Leffmann pleads for greater legal use of photographic methods of duplication, an innovation which we heartily support. (P. 366.)

EX CATHEDRA.

Backing Plates. As soon as the photographic public realised the advantages to be obtained by backing gelatine plates, the plate-makers were not slow in supplying very efficiently backed plates as a regular line. Of course, they charged for the extra work, but the charge was trifling and the plates were cheap, so that we were very willing to avail ourselves of the convenience and to use backed plates whether the subject necessitated it or not. Now that plates have touched what, we hope, will be the high-water mark in price, the cost of backing has also increased, and we may well consider whether it is not worth while to revert to the old method of backing such plates as are actually required just before use. This used to be a simple matter in the old days, for few, if any, colour-sensitive plates were used, and a red or orange pigment sufficed for backing. This is hardly sufficient for orthochromatic plates, especially when a screen is used and the light transmitted is very similar to that reflected from the backing. Hence there has been a tendency to use a black pigment, such as lamp-black, instead of burnt sienna or umber, the black being quite efficient even with panchromatic plates. All that is needed is a little lamp-black, ground in water or beer, from the oilshop, some caramel, and a few drops of glycerine (if obtainable). The colour is mixed with the caramel and as much water as may be necessary, and smeared thinly over the glass side of the plate. If the plate is to be used at once, there is no need to allow the backing to dry; but if a number of plates have to be prepared in advance, they must be placed in a rack and covered up until the colour has dried on. It will be found, if methylated spirit is used instead of water in thinning the colour, that the drying will be effected much more quickly. If a calcium box be handy, the plate rack may be placed therein, and there will then be no danger of the film becoming damp through the proximity of the backing.

* * *

Negatives for Re-coating. In our paragraph last week on the supply of dry-plates subject to the return of negatives (to the amount of 75 per cent.) we ran beyond the book in respect to one item. As several plate-makers have informed us, the negative glass need not—or rather should not—be cleaned, *i.e.*, have the emulsion films removed. Makers prefer to do this themselves, for the reason that they then know the whole of the treatment through which the glass has passed. We believe that varnished negatives are not accepted. The use of retouching medium will not, of course, so we suppose, be reckoned as varnish, although certain coatings on the glass and film sides now used in place of retouching medium might be considered as varnish. On such points we can only conjecture what view a given maker will take. Probably if the stock of old negatives is peculiar in any respect it would be well to send a specimen plate or two.

Print Permanence. The note on another page by Mr. Henry Leffmann, in reference to our article of February 15 last, calls for one or two comments, since it is evident that Mr. Leffmann is judging what we wrote by an abstract, and therefore unknowingly is looking at the subject from a somewhat different standpoint. It is clear that he is classing processes in respect to their ability to yield prints of the utmost degree of permanence desirable, indeed necessary, for the reproduction of legal documents. Our object, on the other hand, was to institute a comparison between the processes commonly employed for making photographic portrait prints in respect to a lesser degree of permanence, yet one sufficient for the ordinary requirements of purchasers of portraits. It was in this sense that we wrote of a twenty-five-year life as a reasonable degree of permanence, and it was on this account that we omitted reference to prints by the ferro-prussiate, gum-bichromate and other processes which are not employed for portraits. With this reconciliation of our text with that of Mr. Leffmann's, we can heartily endorse all he says as to the much greater use which can and should be made, in the production of duplicates of legal documents, of photographic methods. In such enterprise the quality of the paper and its freedom from any trace of action on the photographic image is as essential as the permanence of the chemical material of the image itself.

* * *

A Cosy Corner. With the popularisation of art study, especially among ladies, and the almost universal knowledge of some of the elementary principles of photographic work, the present day photographer has often much to endure from sitters who wish to impose their own ideas upon him, and still more to endure from knowing friends who wish to impress not only the sitter but the operator with their superior knowledge and taste. The sitter can usually be handled without much trouble if the photographer shows a certain amount of sympathy with his ideas, while at the same time he makes the poses which his own experience dictates; but the friend is another proposition altogether. It may be a case where a young sitter is accompanied by a girl friend, who giggles and chatters all the time and is responsible for many spoiled plates; or it may be a troop of relations in attendance upon an infant, who, by their united efforts to be of service, utterly preclude the possibility of making a successful picture. The only way to deal with the question is to keep everyone not actually needed for making the portrait out of sight and, if possible, out of hearing of the sitter. This requires a little tact, but usually no offence will be given if the parties concerned are made to understand that it is a rule of the studio and not a special ukase made on their behalf. In a general way it will often be found advisable to allow a friend to accompany the sitter into the studio, but, before the posing is started, to invite her to take a seat in a comfortable nook or "cosy corner" screened off from view. A comfortable seat and a current magazine or two will help to pass the time, and no sense of repression will be felt by either sitter or friend. With family parties accompanying babies it is well to allow only the mother and nurse to enter the studio, and one of these must stand aside while the exposures are being made. As a general rule, the nurse is the best person to assist, as she is not so likely to attempt to excite the little sitter, nor will she worry over a displaced ribbon just as a happy expression is secured. As far as the friends' "corner" is concerned, there need be no structural troubles about it. A firm folding screen is all that is necessary. The point is that it should be prepared for occupation, and that the friend should not feel that she is tucked away out of sight in an undignified way because she is not wanted.

THE EQUIPMENT FOR OUTDOOR PROFESSIONAL PHOTOGRAPHY.

The selection of an outdoor kit for professional work is a matter for careful consideration, as it is very easy to make a decision which will either result in lasting annoyance or in heavy expense to repair the error. The first point to be dealt with is that of size, and upon this there is a pretty general consensus of opinion in favour of 12 by 10. As the present price of plates and material is so high, there may be a temptation to choose something smaller, and hence it may be as well to give the reasons for the popularity of this size. The most important is that it is a standard one, and familiar to most customers. Nearly all, house and estate work, wedding and club groups, and flashlights of banquets have in the past been made on 12 by 10 plates, so that as a rule no explanation is required when booking an order. In the case of a photographer who adopted 10 by 8 there was constant friction with customers, who found that they received smaller prints than those they had previously had from other firms. If a smaller size is chosen it should be whole-plate at a correspondingly lower price, but as travelling expenses, labour, etc., are practically the same whatever size in reason is chosen, the standard 12 by 10 is an easy winner. Fifteen by twelve is too large for most purposes, and the apparatus too heavy to be carried by one person. It may be worth remembering that for many subjects 12 by 8 or even 12 by 7½ (a 15 by 12 cut across) is quite large enough, and effects a considerable saving in weight and cost of plates. This should, of course, be made clear to the customer at the time of ordering. The camera should most certainly be of the square-bellows pattern. The conical pattern has only one good point, portability, and a host of disadvantages which more than counterbalance it. There should be full rise and fall of front, and if necessary extension pieces, either flexible or loose, should be fitted, so that the centre of the lens may, if necessary, be placed opposite the top edge of the plate without admitting light at the lower edge of the sliding board. A cross-front should also be provided, and a spare one which is cut out to take a small panel which is interchangeable. with the copying and studio camera is also very useful. One photographer we know has a standard panel four inches square which fits all his cameras, indoor and out, above half-plate size. This avoids a multiplicity of flanges and extra fronts or adapters.

A swing back is absolutely necessary; care should be taken that the utmost possible range should be secured. The central slides which carry the pivots and the slotted bars should be made so that the ends are flush with the face of the flange when the camera is closed up. If longer they are liable to be bent. An existing camera can be easily and cheaply re-fitted in this way.

The bellows extension should be at least twice the longest side of the plate, three times is better, but in that case a very large and firm tripod is necessary to ensure steadiness. Two or more bushes for the T-screw should be fitted at various distances in the baseboard, so that the camera is well balanced at any extension. The T-screw should be of the pattern provided with a winged nut, so that the nut may be removed, the screw inserted in the baseboard, put through the hole on the tripod top, then replacing the nut and tightening up. This saves much fumbling about, and scratching the baseboard. Turn-tables are not to be recommended for large cameras, especially for professional work where it may be necessary to screw the camera on to a step ladder or a scaffold board to get the desired position. In this connection it may be as well to point out that a long screw is often necessary—four or five inches is not too much when clamping on to a three-inch plank.

The dark slides should be of the usual book form, and any inner carriers should be made from the full size of the slide. The flexible parts of the shutter should be rebated, so that in case a small slit or hole appears in the hingeing material it will not admit light. It is quite easy to have butted joints altered by planing a groove and glueing on a piece of good veneer. The stops which prevent the shutters from drawing out altogether should come against metal, wood will fret away, and some day the slide will draw right out and a plate, perhaps an exposure, be lost. Safety catches, which also indicate whether a plate has been exposed or not, should always be fitted; they cost but a few pence, and remove all chance of double exposures.

The lens outfit is as important as the camera, and the selection must largely depend upon the amount of money which can be allotted to it. As a general rule, very rapid lenses are heavy and needlessly expensive luxuries. No larger aperture than *f*/6 is needed for ordinary outdoor work, and even this aperture can rarely be used. A convertible lens with a focal length of about 16 inches with singles of about 24 and 30 inches respectively, and a wide-angle lens of about 8 inches will make a good beginning, which can be added to as desired. If convertible anastigmats are too costly, there are many other less costly forms, and even a good rectilinear need not be despised even in these days of lens progress. A telephoto lens may be required occasionally, and the original "Adon" may safely be selected for this. It takes little room in the kit, and the cost is very small. Nowadays no kit is complete without colour screens, so that the best can be got out of isochromatic plates. There is a boom in anti-screen plates just now, but when there is a difficult problem in colour values the screen is an easy winner. Wratten's K 2 and K 3 screens will answer for all ordinary work, and require less additional exposure for the same degree of colour correction than those made with other dyes. The filter yellow K is, we believe, used by other makers, but unfortunately they do not advertise the fact, and its presence can only be detected by the spectroscope. The old brownish-yellow filters give very little correction compared with the newer yellows, and the green ones should only be used where a slight degree of correction is sufficient.

Some form of instantaneous shutter is necessary, but it should be simple and not connected with the lens mount. A behind lens roller blind, or perhaps better a Packard Ideal or central shutter fitted inside the camera and giving time and instantaneous exposures will be found very suitable.

The tripod should be strong and simple, and within reason the larger the head the better. The legs should have a sliding adjustment, and should not be too slender. A floor stand composed of three radial strips which will pack up with the legs is very useful upon stone pavements and in picture galleries, as not only does it prevent slipping but permits the camera to be moved without disturbing its level. Moreover, it keeps the spikes from injuring a carpet or polished floor.

For outdoor work the focussing cloth should be of black waterproof and of ample size, so that in case of a sudden shower or of its being necessary to work in the rain the camera is well protected. A good focussing eyepiece and an exposure meter complete the contents of the case. The case itself may be of leather or stiffened mail canvas, but as solid leather cases are now almost unheard-of luxuries it may be pointed out that a very good and light case may be made of three-ply wood covered with leather cloth. Such a box will not be heavier than a solid leather case, and will answer the purpose until leather is once more obtainable by the man of moderate means.

COSWAY BORDERS.

The following notes are not primarily intended to discuss the merits of the so-called "Cosway" borders, but seek to describe in detail a system of registering them with portrait negatives, and also to afford some hints for applying border designs in less stereotyped directions.

The method of registering is due to Mr. W. H. Smith, of the Platinotype Company, and was first shown by him many years ago at the Croydon Camera Club. Whether the same idea has occurred to others may or may not be so, but certainly it is but little known, and is too useful to remain buried. The principle of printing in borders by placing the sensitive paper against guide-strips is, of course, old. The novelty to be described consists only in the way in which they are affixed in exactly the right position, without demanding any measurements.

Some time ago a negative being wanted from an oval print, the reproduction being destined for a handsome leather folder, a Cosway border suggested itself as likely to give an added finish, which proved to be the case. A Cosway negative of the right size was duly made by copying a drawing, but memory obstinately refused to recall the procedure for laying down the guides. An application to the inventor revealed an identical frame of mind in this respect, and it was only after mature consideration that the elusive principle came to life again. Moral: When found, make a note of; or, what comes to the same thing, preserve this article.

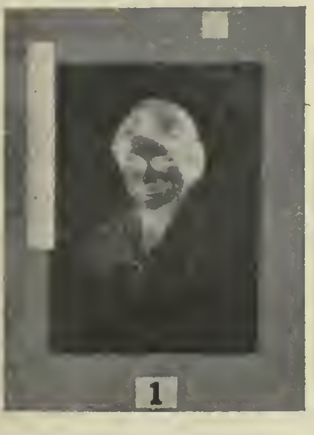
In the half-tone illustration, No. 1 is intended to represent the portrait negative fixed in a cut-out card—a half-plate negative in a whole-plate card, for instance. Gummed strips, preferably attached on the glass side, prevent any movement of the negative relative to the card, which would be fatal. Any play of the latter in the printing-frame is not of consequence. On the right (No. 2) is the Cosway border-negative similarly held.

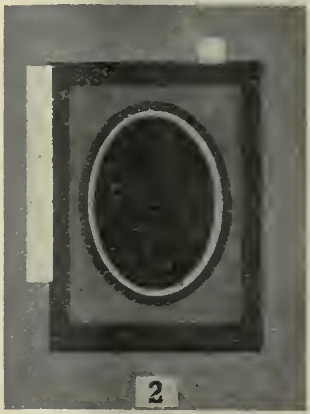
Procedure.

Cut a strip of thin card and apply it to the left of the Cosway negative as shown, allowing a slight overlap, and stick down with "Mendine" or similar adhesive. This forms a guide-line. When the adhesive is set, apply a set-square to the inner edge of the guide, and affix a short strip of card just in contact with the square, in position indicated, allowing a little overlap as before. This acts as a stop. A thickness equal to three to four times that of the printing paper employed will be found about right; if the card is too thin there is a tendency for the printing paper to slip over or under the guide and stop. The cardboard holding the negatives should not be thicker than the glass; if thinner, the parts where the guide and stop are to be located can be levelled up by pasting on pieces of paper. The Cosway negative and card carrier are now inserted in a printing-frame.

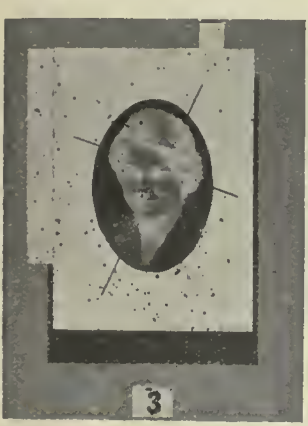
The next step is to determine the exact position of the guide-line and stop on the portrait negative. A sheet of ordinary P.O.P. (the thinner the better) the same size as the Cosway negative is laid down on it, with two edges just in contact with the guide-line and stop, and their positions recorded on the paper with pencil dots. A thick rubber pad is placed over the paper, *clear of the guide and stop,* and the back of the printing-frame is inserted, taking great care not to shift the paper. The Cosway is printed to a fair depth, and the print removed. The two unsymmetrical lines are ruled across the back, and the oval is cut out with a sharp penknife, following the outline closely. Both pieces are now exposed to daylight to render them opaque to light.

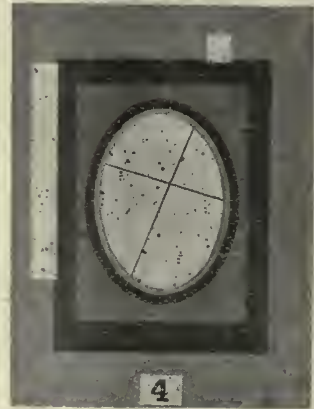
The outer piece is adjusted to the portrait negative, printed side down, and shifted about until the right amount of subject appears through the opening, when the paper is temporarily fixed in that position by gummed strips. A guide-strip and stop of the same length and substance as before are stuck down in contact with the paper, the pencil dots on the paper indicating their position, and the P.O.P. outer piece is removed. Here we have arrived at the stage indicated by 1 and 2 in the illustrations.


1


2

The outer piece is again adjusted to the Cosway negative in contact with the guide and stop, and temporarily fixed with gummed strips. The cut out oval piece is inserted in the opening, the cross lines preventing accidental reversal, and ensuring exact position. A finger is placed firmly on the lower end of the centre-piece and the upper part bent back. A touch of adhesive is applied to the film in the middle, and the paper allowed to spring back, pressure by the finger securing permanent adhesion. The outer piece is then removed, leaving the Cosway as shown at 4. Finally the outer piece is restored to the portrait negative in contact with the guide and stop, as shown at 3, and stuck down with gummed strips (not illustrated).


3


4

The method of printing will by this time be apparent; the sensitive paper, be it carbon, platinum, or bromide, is simply adjusted to the guide-line and stop of each negative in turn, when if the procedure indicated above has been carried out carefully no white junction line should show. The order of printing is immaterial.

Remarks.

It is desirable to place the piece of P.O.P. in a drawer for a short time prior to printing to acquire stability with the atmospheric conditions, and printing should not be conducted in direct sunlight, or to any artificial illuminant capable of heating and contracting the paper. A larger frame for the portrait negative is compulsory in nearly every case, as the amount of subject selected for the oval will in most instances be far from central on the plate. A larger frame for the Cosway will in all cases be found convenient, and in some cases necessary. When a wide margin exists both the guide-strips and stops are naturally transferred to the cardboard carriers.

Commercial Cosways on celluloid are supplied with two guide-lines instead of one guide-line and stop as provided for by Mr. Smith. Sensitised paper is rarely cut accurately at right-angles; consequently, if one side is in alignment with its adjacent guide-line, then contact with a second can only occur at a undetermined point or part. A short strip locates that part, and with advantage. To approximate the three-point contact idea, possibly some will prefer to cut away slightly the inside edge of the guide-strip, in bow-shape, leaving its ends only in alignment, but the straight edge answers all purposes. Since the original of the block was built up it has been suggested that the best place for the stop is close to the guide-strip. Another authority contends, and with some reason, that the right position is midway, but with the stop in the position shown perfect registration is obtained, so that its exact position does not seem of importance. The guide-line can extend the length of the plate if preferred.

A Modification.

With Mr. Smith's method the adjustments take a little time, but once effected the double printing presents no difficulty at all, and the Cosway can always remain set up. A dodge suggested by the commercial Cosways alluded to dispenses with laying down a guide-line and stop for each portrait negative, the Cosway being registered to an opening in an independent mask.

To explain: Regard the cardboard carrier and portrait negative merely as a sheet of thin paper roughly the size of the former. After printing the Cosway border, and cutting out the P.O.P. centre piece as already described, transfer the outer piece to the sheet of thin paper, lay down centrally, temporarily affix, and attach the guide-strip and stop to it in the same manner as before. But, in addition, indicate the opening by pencilling round inside the oval on to the thin paper, and after removal of the P.O.P. outer piece draw a rough rectangle enclosing the oval about half-an-inch or so beyond its extremities, and then cut out the rectangle. If the Cosway has plenty of margin allow a greater clearance. Still regarding the sheet of thin paper as the portrait negative in its carrier, the remaining procedure is carried out in exactly the same way as previously stated, and finally we have a two-thicknessed mask with its opening registered with the Cosway border. After trimming off any unnecessary margin beyond the guide, stop, and P.O.P., all that is required is to fix any portrait negative in a card carrier, adjust the mask over, and shift it about until the right amount of subject is included, when printing is conducted precisely as in the first case.

In small sizes, owing to the comparative thickness of the mask, there may be a danger of bad contact between the printing paper and negative. A pad about the size of the opening in the P.O.P. localises the pressure, and assists to good contact. The opening in the thin paper, being larger than that in the P.O.P. piece above it, tends in the same direction, as only the thickness of the latter lies between the printing paper and the part of the portrait negative to be printed. For small masks two pieces of fairly stout tissue-paper dry-mounted together have answered well. Insert in a paper folder and mount at a low temperature. For larger sizes thicker paper can be used.

Applications.

Once the principle of the registration for double-printing is grasped, its applications will be found almost unending, and should appeal to the ingenious minded. For Cosways of the usual type, copying in the camera a drawing executed in broad style is indicated, and a stock of varying size border negatives can be made from one original. Copying actual frames—unless a diffused image is secured by layers of tulle on the lens, or by other means—results in representations which many will consider too realistic. It is easy with tinted papers to build up a mount which will, when copied in the camera, render effective border tints, but beware of trying to secure softness by placing the image of the papers slightly out-of-focus, for if they possess grain a most unpleasant streakiness may result. Recording actual grain, of canvas, for instance, might be of value for special effects. It may here be remarked in parenthesis, that printing in plain border tints does not, of course, require the foregoing special method of obtaining registration, but these are outside the scope of this article.

Frequently old engravings with a border design can be picked up for a trifle, and for certain styles of work will prove a harmonious adjunct. If much yellowed, or stained, they can be bleached in a solution of chloride of lime, rinsed, immersed in hypo-solution to prevent the paper from rotting (often overlooked) and gently washed and dried between blotting-paper. A nicely-executed design fully, or faintly printed round, or partly around a sketchy vignette, is worthy of consideration. Books on the art of illuminating will contain many a suggestion for scroll-work. In fact, one has only to put a thinking-cap on of quite modest proportions, to evolve all sorts of novelties. True, many at present are faced with the serious problem of getting plain printing done, and to such the added slight complexity of double printing will not appeal. But things will not always be as they are, and as no one knows which way the cat will jump after the war, a few novelties up-the-sleeve may then conjure up cash badly needed. E. A. S.

LIGHT AND DARK BACKGROUNDS.

[In the following notes by one of the oldest writers on studio lighting in the United States, Mr. Felix Raymer, the recommendations, as will be seen, are on the lines of the practice which it would seem photographers in this country are tending to adopt more and more extensively, namely, the employment of fewer backgrounds or even the restriction of their number to two, a dark and a light. Mr. Raymer very properly emphasises the variation in tone of a ground which can be secured by appropriate lighting, and the advice which he gives would certainly remove the occasion for criticism of many portrait photographs on the ground of the jarring contrast between the tone of the sitter and that of the ground. We acknowledge our indebtedness to the "Photographic Journal of America" for this contribution.—EDS. "B. J."]

MUCH has been said and written in the past few years about the reduction of the intensity of light as it falls on the white draperies of our lady sitters. There is no question but that we do get better results where the light is so controlled that we can get the detail in the very whitest parts of the clothing. It is often noticed in pictures that the whites are so intense that nothing can be seen in them, and all there is in those parts is the clear white paper, attracting all attention to that part by reason of its whiteness. This is all wrong. In portrait work no part of the picture should attract more attention than the face. We are making pictures of people that are to be likenesses, pictures that will show them so that all of their friends will know them at once. To do this and at the same time preserve artistic quality we must have some parts that are of more importance than other parts. It then follows that the parts that are of more importance than the other parts must be so lighted that the light will fall on them more strongly than it does on the lesser parts. To arrange the light in this wise has been the effort of the operator for many years.

But there is one factor that enters into the making of negatives of artistic merit that has not been given due consideration, and yet it has a bearing on all subjects posed under the light. It is the choice of the background. Many years ago it was the custom to have the ground attract as much attention as the subject, and this was done by having all kinds of "banjo work" painted in it. Such a thing as selecting a ground for the particular effect of light we were expecting to make was not thought of. Neither did we think of using judgment in the selection of the ground for the particular subject and the drapery the subject was dressed in. This was too far advanced for us at that time. Even now there are few that consider the draperies in the choice of the ground, and yet they are of much importance. It often happens that the reception-room clerk will ask the customer what ground he or she would prefer, leaving the choice of this important matter to one who has no idea of such things, and the operator may never have seen the costume to be worn, and may not even know whether the subject is a blonde or a brunette, and, of course, has had no voice in the selection of the ground. The subject is often influenced in the selection of the ground by the number of lines in it. The more there are and the sharper they are defined the better pleased the sitter often is. But the operator knows there is much to be gained by proper selection.

It is the custom in nearly all studios where the operator understands the use of light and shade for him to have some means of controlling the light as it falls on the subject's dress, if it is a white one, so that the intensity decreases as it goes to the lower parts of the picture. This is done so as to centralise the attention more at the face and to hold up to the attention the upper portion of the picture, allowing the lower parts to fall into place in their proper weight. This control of the light is done in the operating-room by the use of screens, or often it is done in the dark-room by local reduction. It matters not where it is done so long as the object is attained.

There are many cases when there should be no reduction of the draperies, for the ground used will necessitate the draperies being much higher in tonal value than would be the case if some other ground had been employed. If the selection of a ground is left to me I will rule out all else except plain white and black. Not that I advocate the idea of having absolute white nor absolute black in a picture. I think it was Sir Joshua Reynolds who said "there is never a time when there should be absolute white in a canvas, eight feet square, larger than a pea, and neither should there be absolute black any larger than a pea." If this is true of a canvas of eight feet, I would like to know how large the white or black should be on a picture, say, eight inches square. But while I do not advocate the use of absolute white or black, I do advocate the use of absolute white or black *grounds*—not that I expect to make them come up in black or white, for it is well known that we can often get many tones from the same ground by the manner of placing it under the light. If the ground is black and we want a slightly lighter tone, it can easily be secured by facing it farther to the light; or, if such a thing is wanted, we can make it absolutely black by having it facing away from the light in such a way that all of the light is off of it. So it is with the white ground. It will be perfectly white if it is facing the light, but if it is facing away from the light it will be many tones below white. So, I say, all tones of work can be had by using only the white and black grounds, and the work will harmonise better than if middle tints are employed.

Next comes up the question as to what we would use the white grounds for, or what would we use the black grounds for. It has been my custom to use the white grounds for the white draperies and the black grounds for the dark draperies. Now I know I have said something that many will rise up and question. It has been a belief for I don't know how long that a dark dress or coat will not look well in front of a black ground—that the qualities will be buried in the ground. This is not so to the extent of spoiling the effect, but rather the reverse. If the greater portion of your subject is dark—that is, the drapery is dark, and we will say the hair is dark—and we were to use a light ground, it would be but undoing all of our efforts in the arrangement of the light and shade in soft effects. There would be a sharp, clear-cut outline that would show all of the little irregularities of the outline, for the reason that it would be clear-cut against a white field. This, we know, is not the proper idea of concentration and subordination. If we are to have a balanced lighting, as far as light and shade are concerned, we will have to look to all things, the little as well as the large, and the background plays no small part in the arrangement and placement of lights and shades. We should have our work divided into two classes—the low class, or low tone, we call it, and the high tone. Now to the low tone belong the dark draperies and brunettes, and to the high tones belong the white draperies and the blondes. If the subject is dressed in black and is a brunette, he or she belongs to the class known as the low tone, and all else must be arranged to harmonise in that tone. If we introduce in that picture some feature that belongs to the high tone we will be working at "sevens and sixes," and a lack of harmony will result. There is no time when there should be two forces in a picture that have the appearance of pulling against each other. Let everything trend in one direction, and that direction is harmony. So if we have such a subject our ground should be dark to harmonise with the subject. And it will be found, if tried, that it is an absolute impossibility for one to get the black dress and the black ground so near together that they will blend perfectly, and still have *detail in the shadows of the picture.* It is well known that there is *no time when we should have absolute black* in our pictures (I recall again Sir Joshua Reynolds' words).

Now if we have a subject dressed in white draperies, and she is a blonde, it is my plan to use a white ground. Not that I make it perfectly white in the finished picture—for I do not want that—but I can arrange it so that it will harmonise with the dress better than I could if it were a black ground. Again, some may think it will give the picture too much of a sameness, with no definite outline. This is wrong, as there will be all the outline that there should be. If we have such a subject, and were to use a black ground without the customary screening before spoken of, we would have sharp outlines, and, in addition to that, we would have strong halation around the figure against the black ground. But if the white ground is used there will be but little, if any, need of holding back the draperies with the screens.

Now, next comes up the question, "Can I not make pictures of a subject dressed in white and still use a black ground?" Certainly one can; but it is in this, as in all things, where a change is necessary from a natural course to one foreign to nature. It takes a man that understands nature thoroughly to combat nature. It is nothing but nature for a white ground to harmonise better with a white subject than it does with a dark one. It is also natural for a black ground to harmonise better with the dark subject than it will with the light or white one. If we are to change these conditions we must have a thorough knowledge of the whys and wherefores of this harmony.

It has been my experience that if we attempt lighting a sitter that is clothed in white, and is a blonde, against a dark or black ground, the draperies will have to be skilfully handled to keep them from getting away from the dark-room man and over-developing so far that all detail is lost in the whites. This is, of course, done by the judicious use of screens, or local reduction, as mentioned before. But as soon as we do this we are but trying to make harmony where harmony does not exist. To do it I have to tone down the figure to harmonise with the black ground. Here we are pulling the whites down to the blacks, where by the use of a white ground we would have been pulling the whole scheme of light and shade up to a higher key, and thus have secured the harmony. Felix Raymer.

Metzo, Limited, Rickmansworth.—Mr. E. D. C. Lord has been appointed general manager of this company, vice Mr. H. J. Mallabar, resigned.

RED-CHALK, PURPLE-RED, AND BLUE TONES ON BROMIDE AND GASLIGHT PAPERS.

(From Rajar "Trade Notes.")

We have lately carried out some interesting trials with the process of gold-toning bromide and gaslight prints which had already been toned with sulphide and hypo-alum. The results obtained were very pleasing, and we think the details will interest our friends. A gold toning-bath was made up as follows:—

Ammonium sulphocyanide ...	40 grains	in water, 18 ozs.
Gold chloride	4 grains	in water, 2 ozs.

The gold solution was added gradually to the sulphocyanide solution. The prints were put straight in the solution and kept on the move until the final tone was reached. They were then removed, washed for a minute, placed in a fixing-bath of 3 ozs. of hypo to the pint of water for three minutes, washed for fifteen minutes, and dried. We tabulate the results below:—

1. Bromide prints toned with sodium sulphide.—Toning complete in five minutes. Colour, bright red. Very slight intensification.

2. Bromide prints toned with hypo-alum.—Toning complete in eight minutes. Colour, a fine purple red, somewhat similar to portrait-purple carbon. No intensification and practically pure whites.

3. Gaslight prints toned with sodium sulphide.—These results were the least satisfactory, the colour being a very fiery red.

4. Gaslight prints toned with hypo-alum.—Toning complete in two minutes. Colour, a fine red-chalk. Very slight intensification.

The results on Rajina papers were very similar to those obtained on gaslight papers. Some untoned bromide and gaslight prints were placed in the gold toning bath, and in three minutes the bromides were toned to a deep blue-black quite free from double tones. The gaslight prints reached the blue stage in less than one minute. Prints that were green and over-exposed were vastly improved by a short immersion in the gold bath.

These very warm tones show to the best advantage in vignette heads on a white background. There is every reason to believe that the results are permanent, and the process offers to the photographer an easy method of obtaining something different from the "usual thing." The toning bath can be applied with cotton wool when dealing with enlargements, as the process is somewhat wasteful of gold. A window display of a few large sketches in red-chalk, with perhaps a sketch or two of naval portraits in blue-black, would be very attractive. There seems little scope for error in the process, but when toning black gaslight prints to a blue colour the prints must be removed from the toning bath the instant the tone is obtained, otherwise the whites will turn yellow.

PERMANENCE IN PHOTOGRAPHIC PRINTS.

(A Note in the Journal of the Franklin Institute.)

In the current number of the Journal of the Institute (May, 1918) a short abstract is given from the "British Journal of Photography," concerning methods of producing permanent photographic prints. The matter is of great importance, nowadays, because the application of photography to the copying of written and printed records is rapidly displacing the old method of transcription. The general features of the method were presented by me in a paper read before the Photographic Section of the Institute in October, 1901, and published in the Journal a month later. I there showed the great advantage that would accrue if the ordinary municipal records, such as deeds, mortgages, and wills were copied by photography instead of by the present tedious and fallible methods of transcription. Not the least advantage of the photographic method is that the signatures, erasures, correctione, spelling, and punctuation are faithfully reproduced.

The "British Journal" article speaks of a guarantee of permanency for about a quarter of a century, but this is far short of what official business will require. The processes mentioned are platinum, carbon and silver bromide. Under existing conditions, platinum should not be allowed for use in photography. The carbon print is unfading, whether produced in the earlier forms or by the later and now much used "gum-bichromate" method. It is notable that the "British Journal" does not refer to the blue-print. This seems to be as permanent as any. It is inexpensive, simple in manipulation, and reproduces distinctly the finest detail. When I prepared the paper noted above, I inquired of a railroad engineer as to the durability of blue-prints, and he told me that his company had in its vaults prints at least twenty-five years old, which, so far as could be judged by inspection, were as vivid as the day they were made. I think, therefore, that in this matter the blue-print should be given a full investigation.

A very important feature of this question is the quality of the paper. It is likely that more failures in permanency will obtain from bad paper than from a bad process. Methods of testing paper are now so highly developed that it will be quite easy to establish specifications which will give a paper at reasonable price that will last for centuries. It should be free from chemicals that may react with the deposit that forms the print.

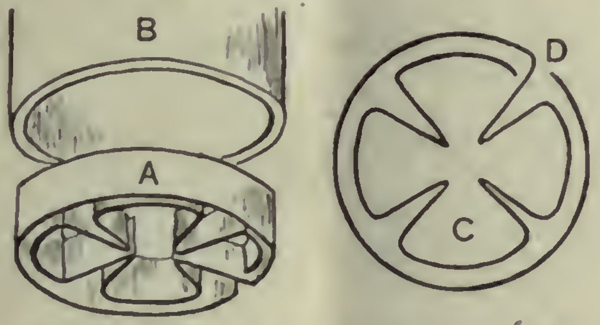
It is greatly to be regretted that the record offices of our municipal, State and national governments have not adopted extensively the photographic methods of copying. Such methods are more rapid and cheaper than the transcription, even when typewriting machines are employed, while, of course, as far as regards accuracy, even to the minutest detail, the best transcription cannot compare with the photograph. HENRY LEFFMANN.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Anti-Splash for Dark-room Taps.

The accompanying sketches show a simply-made anti-splash fitting for the dark or work-room tap. It is made by taking a strip of spring brass about ½ in. wide, bending to shape (A) by means of pliers, and inserting in the nozzle (B). C is a plan of the fitting. The diameter of the device, before being inserted, should be slightly greater than that of the opening, so that it will remain in place during the flow of water. The "broken" portion of the circular device shown at D in the plan acts as a spring when properly bent, and holds the disc securely in place. L. T. W.



A Small Camera for Nervy Sitters?

A LADY, who is a most excellent sitter in every way, and whom I often have to photograph, said to me the other day: "I do not feel at all nervous when you use that small camera." An at-home portrait was being taken, and I was using a small ¼-plate folding instrument for the work. This opened up a channel for much thought.

Is not the large and elaborate camera sometimes too ornate, too over-powering, and would not a smaller and less assertive instrument sometimes give more characteristic portraits? It does seem in the case of nervy sitters that a small and unpretentious camera is preferable. There is something rather over-powering in the average studio camera, and this is apt to freeze the personality of the nervous sitter.

Of course, I do not here advocate the use of the ultra small camera, but rather put forward the claims of an instrument of more moderate size, say ½-plate, when dealing with these special cases, as this class of instrument I have found does not tend to produce "camera consciousness" even among the most nervous of sitters.

The ideal is perhaps an instrument of this type with a long focus large aperture lens of the "Telecentric" pattern, and an accurate focussing scale. The studio floor may be marked out in distances to enable us to adjust the focus with accuracy, and to operate without overmuch ostentation.

It is certain that if attention is given to the points noted above, coupled with an ease of manner and pleasant conversation on the part of the operator, it will go far to solve a rather pressing problem that, sooner or later, every photographer has to encounter.—ATLANTIS.

Repairing a Pneumatic Release.

THE other day I was troubled by the pneumatic release of my T.P. shutter, the bulb of which was constantly coming unscrewed from its tube, and so I had to try and tinker up the fitment. The ball and tube were first of all disconnected; and a tiny fragment of tissue paper was, after some manipulation, fixed with "seccotine" round the thread by which it was connected with the ball, and then the tube was set aside for the adhesive to get thoroughly dry, twelve hours being allowed in order to ensure this. The tissue paper was then "seccotined," and the thread on the tube screwed into its bush in the bulb, the paper having the effect of lifting up the space caused by wear between the threads, and the additional spot of adhesive will also prevent the thread coming further unscrewed.

While on the job, I further repaired a weak place in the tube where it had previously been bent at a sharp angle. This was done as follows: I obtained a scrap of odd black passe-partout binding. This was wound (after being previously well moistened with hot water as usual) round the tube at the part affected very tightly, and, as a further preventative, the edges were "seccotined." Some very fine wire was then twisted twice round the tube at the ends of the binding, and secured by winding the two ends together with a pair of pliers, and cutting off close, after the manner that the ball is sometimes fixed to its metal thread. This made a most satisfactory repair. It cured the leakage of air from the tube, giving it a new lease of life, and was by no means unsightly, as, owing to the fact that black binding was used the repair could hardly be noticed. —EXPERT.

Exhibitions.

BRITISH SCIENTIFIC PRODUCTS EXHIBITION.

THE British Science Guild has rendered a very great national service indeed by organising an exhibition which, broadly, is a demonstration of the great progress made in a number of branches of scientific manufacture during the past four years. The exhibition is held in King's College, Strand, where it remains open until September 7. Its organisation owes a good deal to the indefatigable work of Professor R. A. Gregory, the occupant of the Chair of Astronomy in King's College and acting editor of "Nature." On the opening day, on Monday last, Professor Gregory was good enough to address a number of scientific and technical journalists on the aim of the exhibition and on the influence which it is hoped it may have upon scientific education. The exhibition, said Professor Gregory, marks the national spirit of adaptability by which industrialists since the outbreak of war have produced materials and appliances for which in pre-war days this country was almost wholly dependent upon Germany. Notable instances of this enterprise in taking up new branches of manufacture are such drugs as aspirin and phenacetin, synthetic dyes and photographic developers. The outbreak of war likewise found the country without a single manufactory of the magneto, essential to motor vehicles and aircraft. But the production of that appliance had now been established on a sound industrial basis, and the German magnetos had been displaced for good. A further example is the metal tungsten, needed for special steels and for electric lamps. Although Germany had no natural source of this metal, it controlled the world's supply, a position from which it has been displaced, whilst British industries have been rendered independent of future supply of this material from an alien source.

A further lesson of the exhibition is the closer union between scientific men and industrialists. Professor Gregory well instanced the industries which have been virtually established by British scientific discoveries but, while they have been neglected in this country, have flourished in Germany. The exhibition provided plenty of proof of the good results which had followed a closer collaboration between the scientific investigator and the manufacturer during the past four years. A further reflection, and one which it may be hoped the public will particularly note, is the pressing need of more scientific training in the higher grades. Professor Gregory contrasted the two chief industrial competitors of Great Britain—i.e., America and Germany—in this respect. In any given year the number of students taking science courses in universities or technical schools of similar rank in America or Germany is three to five times the number in England. In other words, we are tremendously behindhand in the training of men required to take charge of branches of industrial manufacture. A similar comparison applies to the amount of money granted annually for the provision of such scientific education for those over 16 or 18 years of age. The total grant in this country is about £500,000, whereas in America it is close on £7,000,000.

A whole number of the "British Journal" might be devoted to the very numerous and varied exhibits which are to be found in the fourteen different sections. It is necessary that we confine ourselves to those connected with photography, such as are to be found in Section VI. but occur also in other parts of the exhibition. Raw paper base for the manufacture of sensitive photographic papers occupies a prominent position, corresponding with the importance of this question to the photographic industry. Two firms—Messrs. Alex. Pirie and Sons, of Aberdeen, and Messrs. Wiggins, Teape and Co., Chorley—show a variety of specimens of the raw photographic base paper, together with examples of photographs by different processes produced on the British-made raw base. In this connection reference must be made also to the exhibit of Messrs. Thomas Illingworth and Co.—namely, that of paper prints and enlargements produced on raw base which is baryta-coated in the firm's own factory. Paper of this manufacture is made of the extreme width of 54 ins., and has received adequate testimony of its quality through the many battle pictures prepared upon it by Messrs. Raines, and exhibited at the Grafton Galleries and elsewhere. Messrs. Illingworth also exhibit for the first time a sensitive paper for direct X-ray photography, and show numerous specimens obtained with this lighter and less expensive substitute for glass X-ray plates.

The Platinotype Company, which shows the customary choice specimens of its work, is able to include a new photographic printing "Palladiodotype," originated during the war, and serving to replace in some measure the papers containing platinum compounds, the production of which has necessarily been restricted by the demand for platinum metal for other purposes.

Messrs. Ilford, Limited, have an exhibit which, perhaps more than any other, is typical of the general scheme of the exhibition—namely, the replacement of products previously obtained from the Continent. They show specimens of the new pure colour-sensitising dyes employed in the manufacture of orthochromatic and panchromatic plates, and completely rendering photographic plate-makers independent of German supplies. A further interesting exhibit is a series of spectro-photographs showing the remarkable quality of the new special rapid panchromatic plate worked out by the Ilford Company, and representing greatly advanced performance in military photography.

Messrs. Johnsons naturally give prominence in their exhibit to the British-made chemicals for photography, including amidol, metol, glycin, pyro, and paramidophenol. Another and a very notable instance of the displacement of the German.

Messrs. Johnson, Matthey and Co. show specimens of their work in the production of precious and rare metals for the ceramic, jewellery and optical trades, as well as of metallic magnesium, a former branch of their business which has been revived in conjunction with Messrs. Vickers, Limited.

British optical firms are not so largely represented at King's College as they might have been, as a quite natural result of the very great demands which continue to be made upon their factories, demands which forbid even such a small divergence of their activities as the preparation and arrangement of a trade exhibit. Messrs. Aldis Bros. show sighting telescopes, and Messrs. Taylor, Taylor, and Hobson, in addition to showing certain measuring instruments, exhibit specimens of the now famous Aviar lenses employed in aerial photography, and outdistancing by their results those of Zeiss, of which use was made in the very earliest stages of the equipment of aircraft for photographic observations.

Messrs. J. H. Dallmeyer, Limited, show specimens of one or two models of their photographic objective such as are used for photography from the air, together with others designed for the optical measurement of gauges by the projection method.

A scientific industry of an importance very much greater than its size would indicate is that of the manufacture of "graticules," the glass discs bearing accurate scales of various kinds, which are a vital part of almost every optical instrument employed in warfare. These scales before the war were almost exclusively German productions, but their manufacture, by a photographic process, has been taken up, worked out, and developed to a high point of perfection by Messrs. Rheinberg and Co., who show examples of the very many different patterns which they are producing. Messrs. Rheinberg likewise exhibit specimens of platinum mirrors, consisting of an untarnishable coating of platinum on glass, and capable of withstanding even rough handling.

The visitor to King's College during the present month will thus find a host of exhibits which have a very real industrial and scientific interest. We are able to refer to those connected with photography, but the stalls representing recent developments in the manufacture of glassware, electric appliances, textile goods, and chemicals and drugs contain exhibits which have a pre-eminent importance for the future of many industries in this country. The thanks of the nation are certainly due to the British Science Guild and to Professor Gregory, the Chairman of the Exhibition Committee, for the motive which has prompted the bringing together of this collection, and for the organising work by which the visitor is able to gather, from the contributions to the catalogue, the importance of what has already been accomplished.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

The following applications have been made for patents from July 15 to August 3 (inclusive):—

FEEDING DEVICES.—No. 11,792. Feeding and measuring devices for rolls of photo-sensitive material used in photographic cameras. Sir A. Herbert and L. Miles.

IRON-PRINTING PAPERS.—No. 11,900. Iron photographic printing process. W. H. Wilcockson.

PHOTOGRAPHS.—No. 12,187. Photographs mounted in wood for fretwork. F. T. Corkett.

STEREO-CINEMATOGRAPHY.—No. 11,952. Stereoscopic cinematography. L. L. Ruffier.

COLOURED PHOTOGRAPHS.—No. 12,591. Producing coloured photographic pictures. J. H. Cristensen.

CAMERAS AND SHUTTER.—Nos. 12,493-6. Cameras and focal-plane shutter. H. J. Craymer.

AIRCRAFT CAMERAS.—No. 12,326. Photographic apparatus for use in aircraft. E. M. Langley.

EXPOSURE.—No. 12,316. Discovering time of exposure in photography. N. Stefani.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

RACKS FOR DEVELOPING TANKS.—No. 117,108 (Dec. 13, 1917).—The invention relates to plate racks for use in developing tanks in which use is made of a channeled base plate from which extend rods that constitute guides for an adjustable channeled clamping plate adapted to be locked in any desired position on the rods. The invention is designed to provide an adjustable rack suitable for use with plates of any usual size. It comprises a plate rest adapted to receive the edges of the plates to be developed and having a central aperture for the passage of liquid. This rest has mounted thereon uprights carrying an adjustable gripping piece to grip the plates when they have been placed on edge in the plate rest, this adjustable piece also having a central aperture for the passage of liquid. The uprights are provided with locking members to lock the gripping piece in position when it is against the edges of the plates.

A hook may be used whereby two guide rods may be bent slightly towards one another and tension may be exerted between the guide rods and the adjustable clamping plate thereby locked in position.

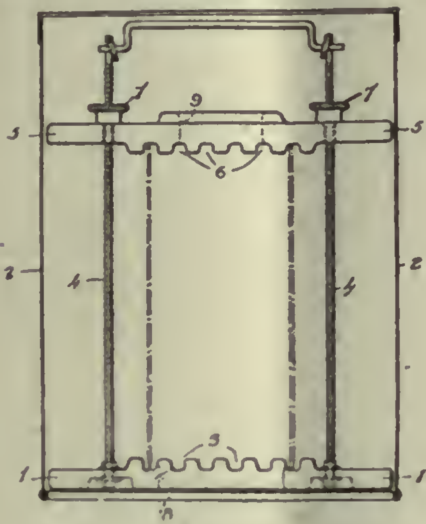


Fig. 1.

The guide rods may be screwed for all or a part of their length in order that each rod may be fixed to the base plate by means of nuts on the rod and if desired the adjustable plate may be locked in position by means of nuts on the rod.

In the drawings a disc or plate 1 is preferably shaped to correspond with the form of the tank in which the rack is to be used. The disc is preferably formed of metal and forms a rest for the plates to be developed. A series of grooves 3 are formed across the upper surface of the plate 1 adapted to receive the edges of the plates. A hole 8 preferably 1½ inches diameter is arranged in the centre of the plate 1. This plate 1 has mounted thereon four uprights 4 adapted to carry a plate grip 5 in the form of a disc or plate the same shape and dimensions as the plate rest 1. The gripping piece 5 is provided on its underside with a series of gripping grooves 6 adapted to register with the grooves 3 on the plate 1. The piece 5 is also provided with a hole 9 in the centre about 1 inch in diameter through which the developer can be poured out and water poured in to wash and hypo solution to fix. The plate 5 is provided with a plain metal top, approximately the size of the tank 2.

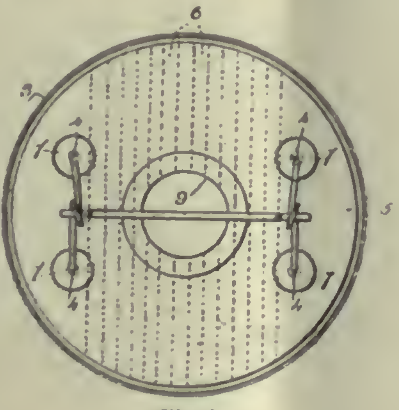


Fig. 2.

When the plates to be developed have been placed in position in the grooves 3 of the plate 1, the gripping piece 5 is moved down the uprights 4 into engagement with the upper edges of the series of plates, thereby gripping the plates firmly in position. In order to hold the plate grip firmly locking pieces which may suitably be in the form of milled nuts 7 are screwed down over the uprights 4 against the upper surface of the plate grip 5 and consequently hold the grip 5 in position against the edges of the plates.

In an alternative form, the locking piece may be in the form of a wire mounted on one upright, and provided at its free extremity with a hook adapted to hook over the opposite upright. The length of this wire hook may be slightly less than the distance between the pair of uprights to which the ends of the locking piece are to be attached, and consequently when the plate grip is in position against the edges of the plates the wire hook tends to bend the uprights slightly towards one another, and thereby puts the uprights under slight tension and firmly holds the grip in position. William Frederick Johnson, 67, Charles Street, Milford Haven.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

Rhodoid.—No. 381,136. Celluloid in sheets, rods, tubes, and similar forms. Société Chimique des Usines du Rhone, 89, Rue de Miromesmil, Paris, France, manufacturers. Address for service in United Kingdom is care of Mewburn, Ellis and Pryor, 70 and 72, Chancery Lane, W.C.

TRADE MARKS REMOVED FROM REGISTER.

In the official language of the "Trade Marks Journal" the following trade marks have been "removed from the register through non-payment of renewal fees." Such non-payment is of course the method adopted by a firm having no further occasion for the use of a mark.

Dafenol.—No. 264.205. Registered in Class I. by O. Schölzig in 1904.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, August 17.

Hanley Photographic Society. Outing to Bagnall.
Manchester Amateur Photographic Society. Outing to Smithill's Hall, Bolton.
Hackney Photographic Society. Outing, Loughton to Abridge.

Tuesday, August 20.

Hackney Photographic Society. Monthly competition. "A Domestic Interior."

CROYDON CAMERA CLUB.

The president, Mr. A. F. Catharine, last week made his first contribution since accession to high office, with a much-postponed discourse on "Steam." A better designation, he said, would have been H_2O, but many felt a constitutional repugnance to what the lettering indicated.

In his dissertation Mr. Catharine was greatly assisted by the blackboard, which, not having suffered renovation at the hands of the secretary, still accepts chalk, though unwillingly. Evidently tired, but it has had much to endure over long years, the first indignity recollected being inflicted by a youthful scientist who plastered its face with a formula for a powerful benzene developer, which on trial obstinately refused to associate itself in any way with the latent image. This behaviour was all the more regrettable as it had been pointed out that the functions of benzene derivatives could be calculated in advance with precision. The incident, however, afforded much gratification at the time to the "blooming practical."

Club reports being primarily in the nature of a condenser, Mr.

Catharine's "steam" is necessarily reduced to a watery statement that he very clearly and most interestingly explained the elements of the subject, with a detailed consideration of up-to-date turbine plants. With a club so full of experts on every conceivable topic, interest always attaches to the discussion, for often streams of knowledge spring from unsuspected sources. Of course, in these days of technical books for boys, it is easy to run an imposing high-brow show with but slight preparation, but the few questions asked seemed to indicate a genuine desire to acquire further knowledge rather than to impart it.

A true tale illustrating the ignorance which may exist upon a hot topic may be permitted to be told. A new and patent sort of steam-trap was on show at one of the exhibitions, and a visitor (connected with a firm of photographic paper manufacturers) gazed so long and earnestly at the trap as to attract the attention of the attendant, who advanced and asked if its principle was grasped. "No, I don't tumble to it at all," said the visitor. The attendant then obligingly embarked on a long and elaborate explanation, which terminated with an inquiry as to whether he had made himself understood. "Perfectly, thank you, except only on one point," said the visitor. "And what is that?" asked the attendant. "I entirely fail to see where the mouse gets in," came the unexpected answer. "Good Heavens, man! do you take this for a mouse-trap?" gasped his informant. "I certainly was under that impression," politely replied the visitor, and then gazed wonderingly after a tottering figure precipitating rapidly towards the nearest bar.

Commercial & Legal Intelligence.

Legal Notice.—Notice is given of the dissolution of the partnership between Frank Louis Taylor and Pauline Schneider (or Taylor), his daughter, carrying on business as photographers at 60, Bath Road, W., and 106, Holland Park Avenue, Notting Hill, W., under the style of Frank and Pauline Taylor. All debts due to and owing by the late firm at the Bath Road branch will be received and paid by Pauline Schneider, and all other debts by Frank L. Taylor. The business will be carried on in future by Frank L. Taylor at 106, Holland Park Avenue, Notting Hill, W., and by Pauline Schneider at 60, Bath Road, W.

NEW COMPANIES.

Oleo Portraits, Ltd. (151,065).—This private company was registered on July 29 with a capital of £5,000 in £1 shares. Objects: Photographers, photographic printers, lithographers, etc. The subscribers (each with one share) are:—P. Leask, Alderman's House, E.C.2, C.A.; F. Jonckheere, 65, Cole Park Road, Twickenham, Middlesex, clerk. The first directors are:—A. Jonckheere, L. Van Bockel, and C. Cormeau. Solicitors: Bruce Miller and Co., 28a, Basinghall Street, E.C.

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Entries close September 3. Hon. Secretary, 5a, Pall Mall East, S.W.

October 14 to November 30.—Royal Photographic Society. Entries close (carrier) September 20; (hand) September 21. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

Prohibition of Photography.—At Blackwood, South Wales, Ernest E. Nunn, photographer, Pengam, was summoned for unlawfully having in his possession a photographic apparatus at Maesycwmmer. P.S. Gardener said defendant was taking photographs of groups of school children outside the Maesycwmmer School. He did not have a permit and said he had never been questioned before as to his right, although he travelled all over the country. Monmouthshire was a prohibited area, and defendant should have had permission of the competent military authority. Superintendent Porter said it was not suggested defendant had taken photographs of anything other than schools and school children. Fined 20s.

News and Notes.

Naval Photographs Exhibition.—The exhibition of naval photographs at the Princes' Galleries is still proving a great attraction, and it has been decided by the Photographic Section of the Ministry of Information to keep it open for three weeks beyond August 25, the proposed closing day.

Photography and Proposed Luxury Tax.—The report of the Committee on taxes on luxuries issued on Tuesday last shows that the proposed taxation is modelled fairly closely on that in France. Cameras and photographs appear in the classes of goods which are to be subject to tax only when the retail price exceeds a certain amount—15s. in the case of cameras and £2 2s. per doz. in the case of photographs. The case of a camera very well illustrates the difficulties which surround the scheme. Clearly in the present circumstances a camera which costs 15s. or 10s. is as much a luxury as one sold at a guinea or £5. Price unfortunately often does not suffice to define an article as a luxury or the reverse. Considering the great length of time which has elapsed while the Committee has been at work and the changes which have taken place in the committee itself, it seems very doubtful if the recommendations will be embodied in the Budget. As regards goods essential for the carrying on of a profession or business they are to be exempted from the proposed taxation.

The Professional Photographer.—Messrs. Kodak, Limited, in their August issue, announce that owing to paper restrictions their very well-produced magazine will appear in future once every second or third month. This plan has been chosen as preferable to the monthly publication of the periodical in a reduced size or inferior form. The Kodak Co. point out that "the cost of producing four or five numbers under the present conditions is considerably more than the cost of producing twelve numbers a year before the war. The price of the paper alone has risen more than five-fold since 1914, and there is reason to fear that it will rise still higher. As long as it is possible to continue the publication, every effort will be put forth not only to make its reading matter interesting and helpful, but also to maintain the reputation which it has long enjoyed of being one of the best illustrated and printed periodicals in the Kingdom." The August issue fully realises this aim in its literary and illustrative contents. Among the former is an address from the President of the P.P.A., Mr. A. H. L. Chapman, and an article on "Styles," by Mr. F. C. Tilney. The illustrations include some triumphs of lighting and posing from the Boissonnas Studio, Geneva.

Dye-toned Images with Copper Ferrocyanide.—Just too late, unfortunately, for incorporation in the article on page 357 of last week's issue came several corrections, the substance of which is as follows:—The bleached image on treatment with the dye is found to contain silver as well as silver and copper ferrocyanides; caustic soda removes the copper ferrocyanide, leaving the silver and silver ferrocyanide. The dye bath for the No. 2 or orange tone should be made up to 128 ozs., not 380 (i.e., 1 instead of 3 American gallons); the metric formula is correct as printed. In making up the bath for the No. 5 tone, the instruction should be to filter the separate solutions and to mix strictly in the order given, afterwards diluting to the required volume.

The R.A.F. Photo Section.—"The Times" in its reports of the Franco-British advance last week east of Amiens, pays the following tribute to the work of the Photographic Section of the Royal Air Force:—

"Much of the success of the British offensive begun on Thursday morning is undoubtedly due to the accurate information of the enemy dispositions supplied by the many excellent photographs secured by our airmen. Nearly four times as many photographs have been taken during the past week as during the preceding seven days, notwithstanding the greatly increased resistance of the enemy.

"Although little is heard of the R.A.F. Photographic Section in the official communiqués, the achievements of this branch constitute one of the minor wonders of the war. For the excellence of its apparatus and equipment, for the skill of its trained personnel, and for the amazing celerity of its operations, it is universally regarded as a model of its kind. It is no uncommon performance in the Royal Air Force for a dozen or more finished enlargements of a new enemy position to be in the hands of the Intelligence Staff within 45 minutes of the plate being exposed in the air.

"That the Germans themselves are consicous of British superiority in this respect is shown by a recently captured German order, in which special attention is drawn to the various ways in which enemy secrets are continually being disclosed by British cameras, and giving strict injunctions to guard against this."

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

ADVANCE IN THE PRICE OF PLATES.

To the Editors.

Gentlemen,—Re plate dealers' idea of obtaining return of 75 per cent. of the area ordered, most photographers have already cleared out all their old negatives, and by this demand it will mean returning negatives that are of value as re-orders, as no man worth his salt is likely to waste a plate on two exposures where one will do.—Yours faithfully,

Old Pro.

To the Editors.

Gentlemen,—It does not seem that any good purpose would be served by discussion as to increase of cost of production of photographic plates. What consumers require is an authoritative statement of the profits made by plate-makers and also information as to whether all plate-producing firms belong to a "ring." In short the consumer wants to know that the plate-maker is not getting the better of him in consequence of the war. If he is, then let us all encourage new competitive plate-makers "after the war," in spite of 20 years use of one maker's plates as in my own case.—Yours,

Amateur.

To the Editors.

Gentlemen,—It is quite evident the ring of plate-makers have been putting their heads together. The rises in plates are altogether out of proportion to what they have been paying and are now offering for the glass of old negatives, after making due allowance for the present conditions of labour, materials, etc.

Photographers have taken the different rises very passively. But the last is "some" rise, and I think it is about time we put our heads together. This is a lovely war for some, and as it is the only one we have got, some are making the most of it. But all things come to an end But do not let us forget the ring after the war.—Yours faithfully,

S. T. Abrahams.

St Mary Street, Weymouth, August 10.

To the Editors.

Gentlemen,—The latest rise in the price of plates and additional demand for return of 75 per cent. of negatives or glass is not only absurd, but beyond all reason. Photographers have been economising plates in times of scarcity and high prices, consequently the proportion of plates used to orders finished is small. If the average order is for a dozen cabinets, two positions, finished, four negatives taken, then in returning 75 per cent. one negative out of the order has to be scrapped; and if we allow for breakages, another finished negative has to go.

What happens to our re-orders? Most skilled photographers depend on re-orders to recuperate them for their ability and time spent on the preliminary order. This means loss in re-orders, enlargements, miniatures, etc. The price is raised several shillings per dozen, a paltry 7d. is offered ("because glass is dear!") to swell the dividends of the plate ring. P.P.A. wake up. I enclose my card.—Yours truly,

A Constant Reader.

August 10.

To the Editors.

Gentlemen,—As may be imagined, we view with no little concern the recent joint decision of the plate-makers to supply plates to photographers only on condition that 75 per cent. of deliveries after August 1 is returned, carriage paid, as "waste" for the said makers to clean and re-coat.

On a co-operative basis this would appear to meet the difficulties that obtain during the present conditions of the glass market, but what about the firms such as ourselves who, owing to these conditions, are compelled to rely on photographers for their supplies to fulfil important contracts, among others, providing H.M. Government with "circles" for gas masks in use on all the battle fronts, as well as contributing in no small way in the supply of cleaned second-hand negative glass to the plate-makers themselves?

This latter we could continue to do even at a "fixed" price (so long as such "fixed" price was as elastic as the makers' prices, which photographers would do well to make certain of before agreeing to this scheme) if the manufacturers would consult with us instead of carrying this co-operative system to the extreme and the expulsion of the smaller firms.

Speaking entirely for ourselves, if this monopoly is permitted to take place it means the collapse of the above business for one, which is controlled and staffed by "Silver Badge" men, who, on account of their services overseas, have been rendered unable to continue in their pre-war occupation.

I trust you can find room in your valuable columns to give publicity to our point of view: combined with your own esteemed influence a more fair and reasonable way of overcoming one of many difficulties obtaining at the present juncture may result.—We are, Sirs, very faithfully yours,

J. E. Hart and Co., pp. Percy G. Hunt.

Colville Square Mews, London, W.11, August 9.

THE SUPPLY OF GLASS FOR PLATES.

To the Editors.

Gentlemen,—The condition now made by the plate manufacturers, that they will only supply sensitive plates if a proportionate area of the glass is returned to them in the form of negatives or otherwise, will be extremely inconvenient to many if not most photographers. It appears, however, to be a necessity owing to the circumstances of the times and not merely an arbitrary regulation. Up to the commencement of the war a considerable proportion of the glass used for coating with sensitive emulsion was imported, there being but one manufacturer of suitable glass in this country. Importation has now entirely ceased and our one manufacturer is quite unable to supply the demand for glass for photographic and other purposes. Belgium, whence, before the war, we obtained a great deal of our glass, will hardly be likely to resume manufacture for some time after peace, and for new buildings and reconstructional work both here and on the continent the demand for glass will probably exceed the supply.

I am desired by my Council to point out to those interested that the present regulation of the plate manufacturers or some method of obtaining old negatives for recoating is likely to be necessary for a long time forward, whatever may be the happening, and to advise photographers to make arrangements accordingly.

Whether the present rise in the price of plates is justifiable or not is a matter entirely unconnected with the subject of this letter, which is confined to the economic position which has arisen owing to circumstances beyond anyone's control.

Alexander Mackie, Hon. Secretary,
The Professional Photographers' Association.

89, Albany Street, N.W.1., August 12, 1918.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

E. C.—You can obtain celluloid and other materials for use in miniature work, and also a book of instructions on the subject from Messrs. J. Fallowfield, 146, Charing Cross Road, W.C. Messrs. H. Rheinlander and Son, New Malden, Surrey, also supply the celluloid and a special cement for fixing it.

A. M. G.—We do not think 12 ft. enough length of glass; if you wish to work from both ends of the studio, 16 ft. would be better. Also if you have much snow in your locality the single slant pattern of studio would be better than the ridge and would probably cost less in construction.

REDUCING BROMIDES.—Please tell me how to reduce and clear over-exposed and over-developed bromide prints.—E. G. PASCAL.

The best way is with the iodine-cyanide reducer, made as directed in the "Almanac," p. 391. This is the method commonly employed by enlarging firms for dealing with prints which are too dark or need a little brightening up.

GAS TAR.—Can you recommend a chemical that will disguise the smell of gas tar, as the smell is a deterrent to some photographic experiments I am trying?—P. H.

We are sorry that we cannot help you in this matter. There is no scent which would overpower that of the tar, and any chemical treatment would destroy the character of the tar.

REGISTERED BUSINESS.—Would you kindly let me know, where there are two names in a business, and both registered, if one was giving up the business, would he have to write to Edinburgh to let them know he was leaving the business?—H.

In the case of a partner withdrawing from a firm which has been registered under the Act, it is necessary for that partner to give notice to the registrar. In your case it will be to the Edinburgh address, which will be found on the form supplied for the purpose, and obtainable at any post office.

LANTERN SLIDE.—1. Is it possible to take a ¼-plate photograph direct and develop to a lantern slide? 3. Can you tell me if you can supply me with a back number of the "B.J." with a drawing of a copying board and camera? I want to make or buy one.—W. S.

1. Possible, but not practicable as a regular working process. The method consists in reversing the developed negative image somewhat as in the Autochrome process. 2. We can supply a copy in paper covers, price 1s. 6d., post free. 3. A recent article was in the "B.J.," January 5, 1917, price 4½d., post free.

C. G.—From the specimens sent, it would appear that there is something wrong with the postcards, or perhaps your dark-room lamp is unsafe. We note that the satisfactory card of the child is of another make of card, and this is quite good. The portion of the group on the postcard has only just commenced to develop; either the time is too short or the developer is very weak. The slips of the people at a window all show fog, the 2 seconds one is the best; it is not over-exposed, yet the lights are not clean. Try another make of paper, and see that you get a fresh batch. A weak developer should not be used. Develop for full time, and keep as far away from the dark-room lamps as possible

NEW BUSINESS.—At my private address here I do a small trade in copy photography. I was thinking of accepting an offer of an empty lock-up shop. I am not changing my residence. Is it necessary for me to get any licence, or register in any way; if so, where, and does this apply to females as well as males? I employ no labour.—N. E.

The Retail Business Order forbids the opening of a retail trade or business at premises not hitherto used by the retailer, for such trade or business, without a licence. We have not the least doubt you can obtain a licence by applying to the regional headquarters, which in your case is c/o Assistant Director of Recruiting, Harewood Barracks, Leeds.

GUM ELEMI.—In your issue of July 12, 1918, No. 3,060, a new medium for colouring photographs was given. One of the constituents of this is gum elemi. I have tried to procure this from several artists' colourmen without success. Is this material necessary for a satisfactory result, and, if so, can you inform me where it can be obtained?—C. W. A.

As you will see, the purpose of the gum elemi is to stiffen the medium only (it may be omitted), and the author gives an alternative formula. Gum elemi can be obtained from any wholesale druggist; the pre-war price was 2s. a pound. If you cannot obtain it from Messrs. Fallowfield, 146, Charing Cross Road, W.C.2, who supply in small quantities, write Messrs. Harringtons, Ltd., 4, Olivers Yard, City Road, E.C.

HALF-DAY CLOSING.—Thursday is the early closing day in this district, and we close all day for the benefit of our staff. Are we allowed to close Wednesday all day and open Thursday instead? We think that Thursday would be a much better day for business than Wednesday, which is quiet.—L. S.

If the local authority, which in your case is the borough council, has made an order fixing Thursday as the weekly half-holiday, you are not at liberty to keep open on that day, even if you close all the rest of the week. But in certain cases the local authority has power of varying that order, and we should therefore recommend you making inquiry at your town hall. If no order has been made, you are at liberty to fix your own day if you specify it in a notice affixed in the shop, but it is not lawful to change the day oftener than once in any period of three months.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B.J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less	1/-
Extra words	1d. per word.

(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

"Box No." and office address ... ... charged as 6 words.

For forwarding replies add ... 6d. per insertion for each adv't.

If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 3042. Vol. LXV. FRIDAY, AUGUST 23, 1918. Price Twopence.

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SUMMARY.

Most professional photographers, especially those located in villages and small cities, are greatly handicapped by the want of a little elementary knowledge of the principles of photographic work. Suggestions as to the best way of remedying this state of things are given in an article on page 378.

Those who have had trouble connected with the squeegeeing of prints will find in Mr. Kimbey's article on page 382 very full instructions for producing perfectly glazed prints with ease and certainty.

A very full description, with illustrations, of an apparatus, designed by Mr. J. I. Crabtree, of the Eastman Research Laboratory, for the development of cinematograph film at high temperatures, but which is equally applicable to ordinary plate and film work under tropical conditions, is given on page 379.

A very simple and inexpensive method of securing a circulation of water while washing prints in flat dishes will be found in "Assistants' Notes" on page 383.

In view of the growing scarcity of glass we may have to return to paper as a support for the negative film. A note on some experiences with commercial papers forms a paragraph on page 378.

A suggestion which may be of value to photographers receiving a delivery of doubtful-looking hypo which they hesitate to use will be found on page 377.

Notices as to the latest dates for receiving exhibits for the Royal Photographic Society and the London Salon appear on page 384.

Particulars of a French invention for improving the sharpness of titles when printed under rotary photogravure impressions by means of introducing a special fine grain into the lines will be found on page 384.

Three additions to the growing list of British made photographic materials, Unisol hypo-saver, White Band Amidol, and a new negative paper, especially made for X-ray work by Messrs. Illingworth, are dealt with on page 384.

A number of letters with reference to the recent advance in the price of plates, some of them containing suggestions for co-operative schemes which the writers imagine would palliate the present troubles, will be found on pages 386, 387.

A report of a recent council meeting of the P.P.A., at which a large number of subjects of interest to the profession were dealt with, is reported on page 385.

What is described as one of the best and most practical lectures ever given before the Croydon Camera Club is summarised on page 385

EX CATHEDRA.

Dirty Hypo. During the past few months we have seen several samples of very unclean looking hypo, which have been sent by correspondents who feared to use them for photographic purposes. In every case we have found the material quite useable, the impurities being insoluble and in most cases harmless. In recent years the appearance of hypo has greatly improved, the clear, small crystals contrasting favourably with the large lumps, often weighing half a pound each, which, mixed with smaller pieces, powder, dust, bits of straw, rusty nails, and other oddments, made up the contents of a keg of hypo forty years ago. Then it was absolutely necessary either to filter the solution before use or to dissolve it by suspending it in a close muslin bag in a jar or tank. A ready way of testing a sample of hypo is to make two solutions of exactly the same strength, one of a sample of known quality and the other of the hypo to be tested. These should be put into two dishes and allowed to stand until the temperature is uniform. A slip of undeveloped plate should be broken into two pieces, and these dropped simultaneously, one into each dish, the time being noted. They should be watched carefully, and the time taken to dissolve the yellow bromide of silver noted. If both require the same time, the new batch may be taken as satisfactory. If the new sample requires more time to do its work, a stronger solution must be used or more time given. The former is to be recommended, as there is danger in overworking a weak solution. It is to be noted that the trial slips of plate used must be cut from the same plate, and that the edges which were formed by the last cut be marked in some way, as every photographer knows that the thickness of coating of an ordinary plate varies considerably in different parts.

* * *

Artistic Handwork in the Negative. A recent issue of "Harrington's Photographic Journal" contains an excellent example of what can be done by perceptive workmanship in the way of converting a most "ordinary" portrait into something which has æsthetic quality. A pair of prints illustrates some notes on this subject by Mr. Harold Cazneaux, perhaps the most successful exponent of pictorial photography in Australia. That from the untouched negative shows a girl's face surrounded by a mass of rather wiry hair, which in turn is sharply outlined against a very even background. The whole effect is hard in tone as well as in outline, but Mr. Cazneaux has made a beautiful rendering of it by several quite simple means. He has broken up the even tone of the ground by means of blacklead on Billdup applied to the glass side of the negative. By this means also he has merged the outline of the hair with the ground, and then by putting the enlargement a little out of focus and using also a single thickness of chiffon in the anastigmat projection lens he has secured a just sufficiently diffused portrait, the tones in which were obtained in a softer scale of gradation by ample exposure and brief development of the bromide paper. There is nothing altogether new in these devices, but the two prints show what admirable results follow from an understanding choice of them, and from knowing exactly what is sought by their use.

* * *

Negative Paper. The scarcity of glass may possibly lead to our returning to paper as a support for the sensitive film, and under present conditions of working the disadvantages of such a proceeding are not so great as might appear at first sight. In the first place slowness of printing was one of the greatest drawbacks, and waxing or oiling had to be resorted to to render the paper more translucent. With modern bromide and gaslight papers this is not necessary; a stronger light or a little more exposure nearer the light will level matters up. Secondly, granularity was a trouble. This is practically negligible when the sensitive material is in an emulsion and not formed in the body of the paper as in the old calotype process. Lastly, there was fragility, or liability to injury by tearing or exposure to wet, which also has been removed by the almost universal practice of printing indoors and upon emulsion papers which are perfectly dry. We do not know whether any special negative papers are still upon the market, but in past times we have used two—Wellington's, which was excellent and rapid, and Morgan and Kidd's, which was equally good, but slower. More recently we have made excellent negatives on ordinary rapid bromide paper, Ilford smooth rapid being the brand mostly used. Much of the bromide paper now on the market is quite unsuitable for negative work, the raw paper being too coarse and uneven in texture, but the thin and smooth varieties will be found to answer well. We have found amidol and M-Q to be the best developers—any trace of pyro stain on the paper appreciably slows the printing. Retouching can be performed with great facility either on the film side or back of the paper, and less retouching seems to be necessary than with glass negatives.

* * *

Not to Pattern. There are many excellent ready-prepared distempers or water-paints upon the market, and they afford a ready and inexpensive method of renovating backgrounds and reflectors as well as redecorating the walls and ceiling of the studio and reception room, a job which in many localities the photographer has perforce to undertake himself owing to the shortness of skilled labour. Most of the manufacturers of these distempers issue pattern cards showing from one to two dozen different tints to which numbers are attached, these numbers being supposed to identify the colours when ordering the compound. Unfortunately, this is rarely the case; the colours often vary in actual tone, being warmer or colder than the pattern. More frequently also they vary in depth, that is to say a certain colour, say, green, is correct as far as tint is concerned, but it is much paler than it should be. In a recent experience two colours were chosen for the decoration of a large room, a sea green for the dado and a buff for the filling. These appeared perfectly suited for the job, judging from the pattern card, but when the tins of colour arrived the buff was much darker than the pattern, and the green as much lighter, so that the dado was actually of a lighter tint than the filling above it. As the precaution had been taken to cover a small section of the wall and allow it to dry the matter was easily put right by adding a due proportion of a darker sample of the same material before proceeding with the work. Those unaccustomed to the use of distemper colours are warned against judging any colour by its appearance when wet; a dark green which appears the colour of a holly leaf when wet will dry up to that of a young vine leaf. In colouring backgrounds it should be remembered that distemper colours having a sort of bloom upon them appear lighter in the photograph than they do to the eye, and allowance should be made for the fading of some colours, especially greens, which rapidly change in a strong light. When adding extra colour to distemper it should always be well ground with water, either upon a slab or in a mortar; dry colour will cause streaks and smears in the mixture and spoils the look of the work.

SLAVES OF CIRCUMSTANCES.

It would appear that as a rule the photographer begins to learn his business at the wrong end, that is to say that in the majority of cases he starts his career in a fairly well appointed studio with a modern camera and lens, and gets to work without any very clear idea as to the why and the wherefore of most of his actions. If he has a modicum of artistic training or instinct he may turn out satisfactory pictures, and he is then quite satisfied with things as they are. Sooner or later, however, comes a change of conditions, the studio is rebuilt with a change of lighting, he has to use a different lens or he cannot obtain his accustomed brand of plates, and he at once, for the time being, goes to pieces—to recover painfully by a process of trial and error.

Our correspondence shows that a large number are in this condition—the slaves of their studios, their apparatus and their materials, instead of being masters of them. We are always more than willing to help in any case of difficulty, but it is somewhat disquieting to find that there is an almost entire absence of any systematic training or study among those who write to us.

How is this deficiency to be remedied? Only by the effort of the individual, who must first realise his state of ignorance, and then take all measures within his power to increase his knowledge. All cannot tread the same road though all are travelling in the same direction. The hardest task is that of the worker in a small town where no personal instruction is available, and where there is not even a reference library; in such a case the student must rely upon carefully selected books, and upon experiments carried out in as systematic a way as circumstances permit. The chief errors to be avoided are in the first place the study of ordinary elementary handbooks, which only deal with the manipulations of photography and omit nearly all reference to the underlying principles, and in the second the selection of advanced books which require a fair knowledge of chemistry and mathematics before they can be understood. As a beginning the solitary student will do well to procure "The Science and Practice of Photography," by Chapman Jones, and the "Watkins Manual." When the contents of these two volumes have been mastered it will be found that any photographic problem can be tackled with a fair prospect of success. Reading by itself is of little value; experiments must be made to verify the author's statements, as not only is the fact to be demonstrated then firmly fixed in the memory, but the actual appearance of the image made familiar to the eye. Such experiments need not be costly even at the present price of materials; one-fourth of a quarter-plate is sufficiently large for the elucidation of most photographic problems; indeed, one of our most skilful photographic chemists often uses plates no larger than a postage stamp. In this way all the effects of variation of exposure, of time of development, strength of developer, effect of different developing agents, the addition of bromide, intensification and reduction by various methods, colour rendering on orthochromatic plates, the use of light-filters, the increased exposure necessitated thereby, and various other problems should be practically worked out. A similar series of experiments should be made with bromide and gaslight papers, while carbon and platinum printing can be dealt with according to their own particular characteristics. After a fair amount of such practical work, the works of Abney and Meldola may be studied with advantage.

Those living in or near large towns have far better opportunities for obtaining knowledge, for not only are technical libraries available, but, as a rule, day or evening classes where the study of photography may be pursued under the direction of a teacher, are usually held during the winter. Here the tyro has the advantage of seeing the various manipulations performed, and is saved much fruitless effort. No idea of false shame should deter a man or woman of mature years from seeking such instruction. In some of the London photographic schools pupils well over the half-century are to be seen working side by side with youngsters who have only just entered the profession, and no one seems conscious of the disparity in age.

So far we have spoken only of the chemical side of photography; lighting and posing are equally important to the professional portraitist, and to acquire proficiency in these arts there must be a natural aptitude. This alone will not carry the young artist far: experiment is as necessary to him as practice in drawing is to his brother of the brush. The first essential is that the student should have a clear idea of the effect he wishes to produce, and not, as many beginners do, start taking a portrait more or less at random. It is excellent practice to select an engraving or painting and to endeavour to reproduce the lighting upon the living model. Constant study of good pictures and engravings, and the observation of people under various conditions of lighting in everyday life, educate the eye and engender an intelligent perception of things as they are which is quite unknown to the casual observer. Thus the art student in photography has the advantage, for his work can go on at all times and at no cost until he comes to test his knowledge with the camera. Then comes the benefit of his technical study, for he will then be able to distinguish in case of failure between faults of lighting, of exposure, and of development.

If the Fisher education scheme becomes law every youth or girl who is employed in a photographic business will have to attend a technical school for a specified number of hours each week, such time to be counted as if spent on the employer's premises. This should give the profession vastly better assistants than the present way—we cannot call it a system—of letting the youngsters pick up a smattering of necessary knowledge from those who know little more than themselves. Much tiring work would be taken off the shoulders of the principal if he could trust a junior to attend to those duties which only require carefulness and intelligence. It is becoming more and more common for the professional portraitist to be recruited from the artistic rather than from the technical side, therefore it is all the more necessary that the coming generation should have as sound a training as possible, for it is little that their masters will be able to teach them.

A PORTABLE APPARATUS FOR THE DEVELOPMENT OF MOTION PICTURE FILM AT NORMAL AND AT HIGH TEMPERATURES.

(A Communication from the Eastman Research Laboratory.)

ALTHOUGH motion picture film is usually developed in studio laboratories under conditions such that the temperature of the various solutions employed may be nicely regulated, occasions often arise when film must be developed under less favourable conditions and at temperatures approaching the melting-point of the gelatine coating. Thus, in the case of explorers travelling in tropical countries, negative film must be developed as soon as possible after exposure, otherwise inferior results are obtained. In such a case, development has to be conducted at night under existing conditions, and the softening of the film which usually results is no doubt responsible for much of the poor film obtained on such exploring expeditions. Experiments were therefore made with motion-picture film, developing according to the method recommended for the high temperature development of NC film (Communication No. 62, "British Journal" 1917, p. 555).

Possible Methods of Development.

1. In certain cases it is possible to develop at normal temperatures by preparing a quantity of cool water by a process of evaporation, using a porous crock, and employing the cooled water for the preparation of the various solutions and for washing. However, the process of cooling the water requires time, so that this method would be impracticable unless it were possible to remain in the same spot for some considerable time, while if the temperature of the air were different from that of the developing solutions the film would be apt to soften during drying.

2. Using the special developer T_6 (See Summary for formula) and the special fixing baths recommended, and following the instructions as given for NC film, plates, and film pack (Communication No. 62) motion-picture negative film was developed at the temperatures indicated with satisfactory results:—

Temperature.	Time of Development.	Fixing Bath.
75 F.	4½min.	Chrome Alum—Hypo
85°F.	3 min.	Chrome Alum—Hypo
95 F.	1½min.	Formaline—Hypo

While developing for 1½ mins. at 95° F., however, little control is possible and uneven development is liable to be produced. Attempts were therefore made to prolong the time of development by the use of additional agents in the developer.

Previous workers (Lumiere and Seyewetz, "B.J.," 1911, p. 136; J. Bunel, "B.J.," 1910, p. 399; "B.J.," 1912, p. 599) have advised the addition of sodium or ammonium sulphate when developing at high temperatures, though the precise action of the addition agents was not investigated. Preliminary tests showed that at 90° F. the addition of ammonium sulphate to a developer containing carbonate resulted in the production of ammonia, which tended to accelerate development and produce dichroic fog, so that this compound was not considered further.

Sodium sulphate proved, however, to be quite satisfactory, and the following results were obtained with it:—

Time of Development with Motion Picture Negative Film at 95° F.		Nature of Developer.		
		Standard Developer T_6.	Developer + 10% Sodium Sulphate.	Developer + 20% Sodium Sulphate.
1½min.	gamma	1.66	.90.	.70
	fog	.21	.15	.06
	reticulation	nil	nil	nil
3 mins.	gamma	2.46	1.50	1.36
	fog	.29	.25	.21
	reticulation	nil	nil	nil
4½min.	gamma	3.22	1.94	1.62
	fog	.45	.27	.28
	reticulation	slight	slight	slight

From the above it is seen that by the addition of 100 gms. per litre of sodium sulphate the time of development to secure a given contrast at 95° F. is increased roughly from 1½ to 3 mins., and to 4½ mins. by the addition of 200 gms. per litre. In the latter case the sulphate has a tendency to crystallise out, so that a concentration of 10 per cent. to 15 per cent. is the maximum advisable. The contrast, or "gamma," obtained by developing for the times stated is somewhat above the average, though when film is stored at a temperature of 95° F. for any considerable length of time after exposure and before development, the maximum contrast obtainable by development decreases. The above times for development should therefore be modified according to the age of the film and the particular quality of negative desired.

Apparatus.

The following developing outfits are recommended as being readily portable and practical:—

1. A rack and tray outfit. The tray should be about 3 ins deep, while the rack may be of either of the following types: (*a*) A spiral peg rack, the film being wound round celluloid side against the peg in the form of a spiral; (*b*) "the under and over rack," similar to the one for use in the vertical tank, but fitted with pegs on the under side so as to prevent the film from touching the bottom of the tray.

(2) A drum capable of being taken apart and a collapsible tank made of waterproof cloth is economical in the use of solution, but not so reliable as the outfit above.

(3) A developing apparatus, consisting of two reels fitted inside a tank, whereby the film is passed to and fro from one reel to the other is satisfactory when used at normal temperatures, but at higher temperatures the time of development is so short that it is not easy to use the machine without obtaining mottled results. Although by the use of addition agents to the developer, such as sodium sulphate or sodium sulphite, the rate of development may be retarded, as above, the time of development with the developer T_6 cannot be conveniently extended beyond 6 mins. at 85° or 4½ mins. at 95 ° F., which time of development is entirely too short for such a machine.

The apparatus is shown in Fig. 1. It consists of a tank fitted with two reels, A and B, which may be revolved by means of an interchangeable handle, C, while an interchangeable brake, D, can be slipped over the spindle at A or B, so as to prevent a too rapid unwinding of the film. In order to develop a reel of film, the tank is first filled with developer, and the film reeled off on to one of the spindles, the film being then reeled off on to the other, and vice versa, until development is complete.

On trial the apparatus worked fairly well with a dilute developer requiring 15 to 20 minutes development, though if the tension on either reel was at all uneven this produced uneven development, while the emulsion was apt to scrape away at the edges and form as a sludge in the developer and wash water.

Objection to methods 1 and 2 are as follows:

(*a*) Large tanks and racks are necessary, thus involving the use of a considerable quantity of solution for the development of 200 ft. rolls of film.

(*b*) Apart from the bulkiness of the same even when made collapsible, the use of a formaline bath is impossible, owing to the large surface of liquid exposed, especially when using the reel method of development.

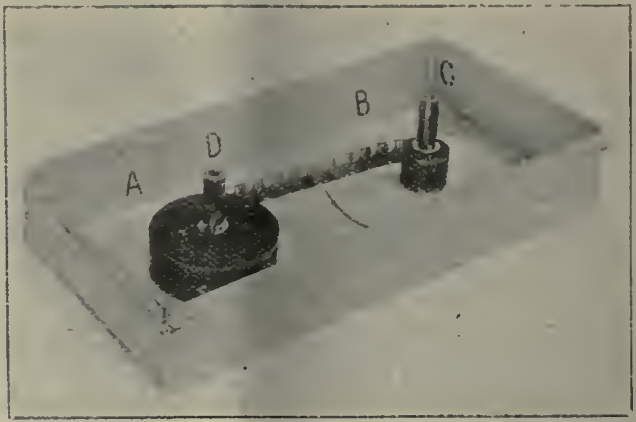


Fig. 1.

In view of the above, the method of developing film by enclosing the same in an apron in a manner similar to that employed in tho Kodak film tank was tried. Preliminary tests gave good results, and an apparatus was designed for reeling and developing film according to this method as follows:

The Reeling Apparatus.

This is shown in Fig. 2, and consists of two brass nickel-plated reels, A and B, which are interchangeable and reversible, and the table, C, fitted with a spindle, D, so arranged that the spool of film from the camera magazine may be slipped over D, engaging with a pin at P. The celluloid apron of suitable width on reel A is hitched to the axle of B, as is likewise the exposed film from C, and both films wound into B by means of the handle H, which is interchangeable between A and B. (See Fig. 3.)

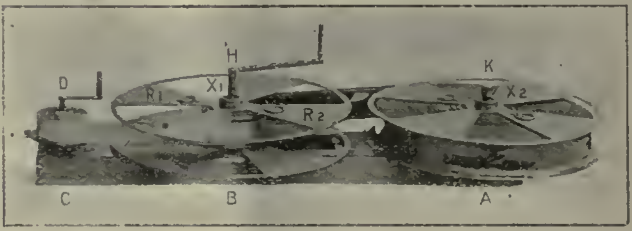


Fig. 2.

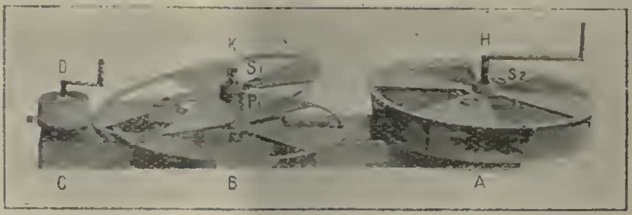


Fig. 3.

A detachable brake, K, may be fitted into spindles S-1 and S-2, while the table C is fitted with a suitable brake likewise. The function of the respective brakes is to keep the film in contact with the apron during winding. The detachable brake, K, may be eliminated if the rim of the reel is braked during winding.

The reels are fitted with rings at R-1 and R-2, to enable the same to be lifted from one solution to another.

The film having been reeled on to B with the celluloid side in contact with the apron, a rubber band is placed around the same when it is ready for the developer. The reels A and B are also so arranged that the upper flange may be removed by unscrewing the collars X-1 and X-2 (see Fig. 2), the central collars P-1 and P-2 are likewise removable, so that after the film is developed by removal of the upper flange as above, the apron may be removed bodily from the reel. When reeling the film, it is important that the film should be at least a foot or so shorter than the apron, while about a foot or more of film will usually be wasted due to contact of the emulsion with the apron. If wound correctly, the end of the film cannot slip back through more than one complete turn, and accordingly the amount of film wasted from this cause is negligible. If a leader of about 2 or 3 ft. is attached to the end, no film whatever need be lost.

The Developing Tanks.

These are shown in Fig. 4, and consist of three tanks, T-1, T 2, and T-3—T-1 being without cover and fitting into T-3 fitted with a cover and removable screw-caps, S-1, S-2. The tank, T-3, in turn fits into T-2, likewise fitted with a cover. The tanks are nickel-plated, and fitted with turn-up rings at L-1, L-2, and L-3 to facilitate the rocking of the trays when full of solution. The capacity of each tanks when containing the reels averages about 8 litres or 2 gallons.

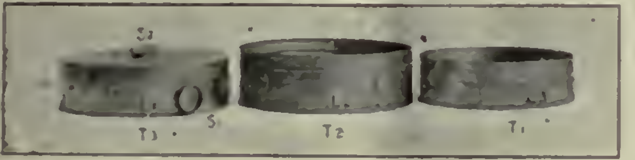


Fig. 4.

Method of Development.

The apron enclosing the exposed film is removed from reel B, and placed in the tank T-1 containing the special developer T-6, lifted up and down once or twice so as to remove air bells, and the tank then rocked in alternate directions for 1½ mins. at 95° F., or 3 mins. at 85° F., or for the required time in a developer containing sodium sulphate.

The apron is then drained quickly, and immersed for one or two seconds in T-2 containing rinse water at the same temperature as the developer in T-1, lifted out, drained, and then immediately placed in T-3.

T-3 contains the fixing bath at the same temperature as the liquids in T-1 and T-2, and is, of course, kept covered when containing the formaline fixing bath.

The following chrome alum bath is used at temperatures up to 85° F. :—

	Avoirdupois.	Metric.
Hypo....................................	7 ozs.	200 gms.
Sodium sulphite (desiccated).........	1 oz. 175 grs.	40 gms.
Chrome alum	2 ozs. 350 grs.	80 gms.
Acetic acid 28%	150 minims	10 c.c.s.
Water to	32 ozs.	1 litre

Dissolve the sulphite and chrome alum together and add to the hypo solution, finally adding the acetic acid.

At temperatures up to 95° F. the following formaline bath should be employed :—

	Avoirdupois.	Metric.
Hypo....................................	9 ozs.	250 gms.
Sodium sulphite (desiccated)	1 oz. 350 grs.	50 gms.
Formaline (formaldehyde 40%) ...	4½ ozs.	125 c.c.s.
Water to	32 ozs.	1 litre

First dissolve the hypo, then the sulphite, and finally add the formaline.

In ordinary practice with large racks and tanks the odour of formaline in most cases prohibits its use, though with the above outfit and using the covered fixing tank (see Fig. 4) the odour of the formaline is negligible. The tank T-3, fitted with a cover and removable screw caps, S-1 and S-2, may be filled through S-1 and emptied through S-2. The tank should be kept covered and the lid removed only to allow of the immersion of the apron.

It is advisable to wear rubber gloves when working with formaline.

Washing.

After thoroughly fixing, the apron is removed to tank T-2, and thoroughly washed in several changes of water at the same temperature as the fixing bath. Washing may be carried out with a minimum amount of water by three or four immersions of 3 mins. each and rocking and draining after each immersion

Drying.

Several methods of drying the film were tried as follows :—

(*a*) The apron was telescoped over a long rod and allowed to dry in the air. In this way the film was dried in contact with the apron and could be separated from the same when dry. However, by this method the first few feet of film are invariably scratched by virtue of pushing out the centre of the roll. If a leader is used scratching of the exposed film may be avoided.

(*b*) By blowing air through the spirally wound apron, thus drying the film in a manner similar to that employed for the drying of prints by means of the Majestic print dryer (E.K.Co.). The method of procedure was to place the apron within a funnel-shaped holder, fitted with a rubber sleeve, so as to fit tight round the coiled apron and to blow hot or cold air through the apron by means of a fan.

The experiments were not successful because drops of water were invariably left on the film, and these left drying marks on the finished film. From this it was considered absolutely necessary to squeegee the film and remove superfluous moisture before drying, if drying marks were to be eliminated.

Attempts were then made to squeegee the film by re-reeling the apron and film from reel A to reel B (see Fig. 2) and passing the film between squeegeeing rollers affixed to a spring so as to take up the slack formed by expansion. Although after squeegeeing in this manner better results were obtained, it was considered that, owing to the bulkiness of the fan required to supply the air, this method was not practicable.

The method finally adopted for drying was simply to re-reel the apron and to wind the film on to a collapsible rack similar to the racks used in the tank development of motion-picture film. The surface moisture was removed from the film with a chamois before drying, the film being sufficiently hardened to permit of such treatment.

If the washing was not thorough, a little residual hypo was left on the back surface of the film owing to contact of the same with the apron, though this was removed during the usual process of after cleaning.

The apron was readily dried by hanging up in the coiled condition, though it was not found necessary to thoroughly dry the apron before reeling a new length of film for development.

Development of Positive Film.

The apparatus may be used for developing motion-picture positive film in exactly the same way as for negative film.

Portability of the Apparatus.

The apparatus is extremely portable, the reels, apron, and tanks fitting into one tank, while the base of the reeling apparatus is made in two parts which fold together as illustrated.

The diameter of the reels for different lengths of film is as follows:—

Length of Film.	Diameter.
100 ft.	14 in.
150 ft.	17 in.
200 ft.	20 in.

An outfit for finishing 200 ft. rolls would therefore only take up a space of 22 by 9 inches.

Summary.

By an application of the apron method of developing film as adopted in the Kodak film tank outfit, a portable and compact apparatus has been devised for the development of motion picture film, while by applying the method of developing at high temperatures as described in Communication No. 62 ("B.J." 1917, p. 555), it is possible to develop motion picture film up to temperatures as high as 95° F. In view of this, and the portability of the apparatus, it is hoped that the method will be of particular value to explorers travelling in tropical countries who must develop their film as soon as possible after exposure and under existing conditions.

The apparatus consists of a celluloid apron somewhat wider than the width of motion picture film, and a suitable reeling apparatus and developing tanks, the film being wound on to the apron, developed, fixed and washed in the apron, and finally dried by transferring to a collapsible frame rack in the usual way.

The formula for the T-6 developer recommended is as follows:

	Avoirdupois.	Metric.
Paraminophenol hydrochloride or Kodelon	105 grs.	7 gms.
Sodium sulphite (desiccated)	1 oz. 300 grs.	50 gms.
Sodium carbonate (desiccated)	1 oz. 300 grs.	50 gms.
Water to	32 ozs.	1000 c.c.s.

The time of development with this developer is 1½ min. at 95° F., but if this is too short for convenience in working, the time may be extended to 3 min. by adding 10 per cent. sodium sulphate to the developer before use.

After developing, rinse for a few seconds, and fix in the following chrome alum bath at temperatures up to 85° F.

	Avoirdupois.	Metric.
Hypo	7 ozs.	200 gms.
Sodium sulphite (desiccated)	1 oz. 175 grs.	40 gms.
Chrome alum	2 ozs. 350 grs.	80 gms.
Acetic acid (28%)	150 minims	10 c.c.s.
Water to	32 ozs.	1 litre

Dissolve the sulphite and chrome alum together, and add to the hypo solution, finally adding the acetic acid.

At temperatures up to 85° F., the following formalin bath should be employed:

	Avoirdupois.	Metric.
Hypo	9 ozs.	250 gms.
Sodium sulphite (desiccated)	1 oz. 350 grs.	50 gms.
Formalin (formaldehyde 40%)	4¼ ozs.	125 c.c.s.
Water to	32 ozs.	1 litre

First dissolve the hypo, then the sulphite, and finally add the formalin.

When developing at high temperature it is very necessary to maintain the temperatures of the developer, fixing bath, and wash water the same, otherwise if the film is transferred from a hot to a cold solution or *vice versa* reticulation of the gelatine coating is liable to occur.

By a slight modification the apparatus could be made suitable for daylight developing, though this would necessitate the carrying of a collapsible box to fit around the reeling apparatus.

The author is indebted to Mr. S. Tulpan for his valuable assistance in the carrying out of the various experiments.

J. I. CRABTREE.

GLAZING PRINTS BY SQUEEGEEING.

[The following article published in a recent issue of our contemporary, "American Photography," deals with the glazing of prints by the somewhat old-fashioned method of a polishing mixture, but the very specific details which the writer gives may be of service to the many who at one time or another find difficulties in getting prints to strip regularly.—EDS., "B.J."]

MOST amateur and many professional photographers, especially those of the professional class who have not taken much interest in glazed-surface prints, mentally classify the process of squeegeeing as a matter of luck and uncertainty, and deem it only a fad for those who have both time and paper to waste. In fact, the writer once had a personal talk with a highly rated professional worker, who occasionally made prints for the engraver, who, as you know, usually prefers or even demands a squeegeed surface. This photographer told me that he was in the habit of always printing double the number of prints ordered, and even then was obliged many times to make reprints to replace those stuck to the squeegee plate, or wrinkled or torn in the very uncertain process of removing them. His idea was that from the worker's standpoint squeegeeing amounted to a loss of time and a ruined temper and was not practical.

Before giving an explanation of the method which I followed with perfect success for a number of years, I will mention the kinds of photographs that can be manipulated in this way. I would not lead the reader to believe that I consider that all kinds of pictures are best finished in this surface, for I am an admirer of matt or velvet surface for many subjects, although I have squeegeed prints of nearly all classes during my experience at commercial finishing.

Squeegeed prints are very satisfactory where one is compelled to get the utmost detail from a thin, transparent negative, or any negative which contains many small details with little or no contrast. The engraver usually desires this surface, as it enables him to reproduce with the least loss of tone. Contractors who have photographs made at different stages of construction always demand the most detail possible and usually have their prints mounted on linen, which can most easily be done while the prints are on the squeegee plate. View photographers who canvass from house to house and depend for their orders upon samples already taken find their work more quickly saleable when finished in this surface, and mounted in the neat slip-in mounts now upon the market. This enables them to save the mounts from unsold work, as the prints are not fastened. Stamp photographers use this surface to advantage, both for appearance and rapidity of drying prints. X-ray plates yield the best prints in this finish. Last, but not least, the professional finisher will find it to his advantage to use it almost exclusively. As a rule his customers will learn to like the finish if they do not at first. At least I found it so in my experience. Most customers will agree that their pictures look more artistic, have better detail and brilliancy, and are far less susceptible to finger prints and scratches, nor will dust adhere to them. Whether the reader is an amateur or professional, he will find the following method always successful, if he pays heed to the small details, which I have found necessary in all branches of photography. Beginning with fundamentals, I will say that much depends upon developing, fixing, and washing. Do not allow any of the solutions to become warm enough to soften the emulsion. During hot weather this difficulty can be overcome by using double trays and frequently changing the water in the outer tray. Use the regular acetic acid short stop between development and fixing. This consists of one and one-half ounces of No. 8 acetic acid to thirty-two of water. It prevents developer from reaching the fixing bath and forming a precipitate to settle on the prints. The following acid fixing bath, which is quite universally used, is the best:—

Water	64 ozs.
Hypo	16 ozs.

After thoroughly dissolving the above, dissolve separately and add the following hardener:

Water	6 ozs.
Sodium sulphite	½ oz.
Acetic acid No. 8	3 ozs.
Powdered alum	¾ oz.

This bath, if properly mixed, is very clear, and will leave practically no precipitate, even after considerable use, and insures thorough hardening of the prints. It should be discarded when it shows signs of precipitation and loss of its hardening properties.

Fix prints the usual length of time, ten or fifteen minutes, but no longer. It is possible to harden prints too much. Soft water is much better for washing, and if used the prints will probably need no sponging before placing them upon the squeegee plates. If the wash water contains lime or other impurities, it is very necessary thoroughly to sponge the surface of each print after the last change of wash water. This may be slightly warmer than the earlier ones, which will allow the precipitate to be more thoroughly removed. Sponging is most successfully performed by placing a board or plate of metal in the wash tray with the edge resting on the side of the tray, and placing the prints, one at a time, face up on the plate, just out of the water. Use the thumb of one hand to hold the print and rub the print with the palm of the other hand, using downward strokes. When one gets the hang of it, several hundred prints can be cleaned in a very short time, without either tearing or crumpling. The cleaner the surface of the print as well as of the squeegee plate, the higher the polish and least risk of failure in removing when dry.

Now, as to the apparatus and materials necessary in addition to the regular finishing outfit. Mine consists of six large metal squeegee plates, a large ball-bearing print roller, an electric fan, a bunch of best grade lintless blotters, a bottle of benzine, one of polishing solution, and a number of polishing cloths. The polishing solution is easily made by adding one ounce of paraffin oil to four or five ounces of benzine. Lump paraffin may be used, but it takes some time to dissolve. The cloths must be soft in texture if you wish to keep the surface of your plates from soon becoming dull. It is imperative that new cloths be washed before use, for the purpose of removing the starch, otherwise sticking of the prints will invariably result.

The preparation of the plates is of the utmost importance. If small threads of film or paper from the edges of prints remain on the plates, remove this with a damp cloth. Then thoroughly clean the plate with benzine and rub dry with one of the cloths, which should be kept exclusively for this part of the polishing. Then cover and polish with the paraffin solution, using another special cloth. Lay the prints face down upon the plate, and with blotters and print roller remove every bit of moisture possible. More moisture can then be removed by rolling without the blotters, using considerable pressure to press out both water and air-bells. Be careful that some of the prints do not suddenly roll up around the roller and become damaged. If the prints slide around easily it is an indication that they have probably not received sufficient hardening or have been slightly melted. Now place the plate a foot or so distant, directly in front of the electric fan. If a considerable number of prints are to be treated, you may proceed to fill other plates in the same manner, and generally by the time you have the second or third plate prepared the first will be ready to remove, that is, providing the temperature and atmosphere are favourable. Do not try to remove them until quite dry. Prints that stick while yet slightly moist will come off with perfect ease when dried a few moments longer. The prints should not blow or come entirely off spontaneously, although they may loosen some at the edges. If they blow off while still wet, too much paraffin has been left on the plates. In this case, use more pressure in the polishing, which removes more paraffin. A small amount of experience in polishing will soon start one right, and prints may be squeegeed by the hundred with uniform success and without any loss whatever.

After removal, prints should be curled face out, by drawing them between the edge of a ruler and the knee, and immediately placed in the press or under considerable weight until bone dry, after which they will remain perfectly and permanently flat. The pressing is not altogether necessary if one wishes to turn the work out immediately.

As I mentioned mounting prints on linen, I will give briefly my methods for this manipulation. You cannot use the fan for drying very successfully with this. The linen should be moistened and wrung as nearly dry as possible. While the prints are still wet upon the squeegee plate, smear them with liquid glue, being careful to use a very thin coat and not to allow it to get off the prints and under the edges. Adjust the damp linen to the prints, and with blotter and roller roll gently long enough to get the linen thoroughly in contact with the prints. Place six or eight thicknesses of blotter, also something stiff and a weight on the prints, and allow plenty of time for drying. I have had very little bad luck with this method, but be careful in the later use of blotters that have accumulated glue and take special pains to remove any trace of glue that gets on the squeegee plate.

Again may I repeat that continued success in this work is due to carefulness and attention to technicalities. Use more pains than seems necessary at all times, and it will save waste and a ruined temper in the long run. F. W. Kimbey.

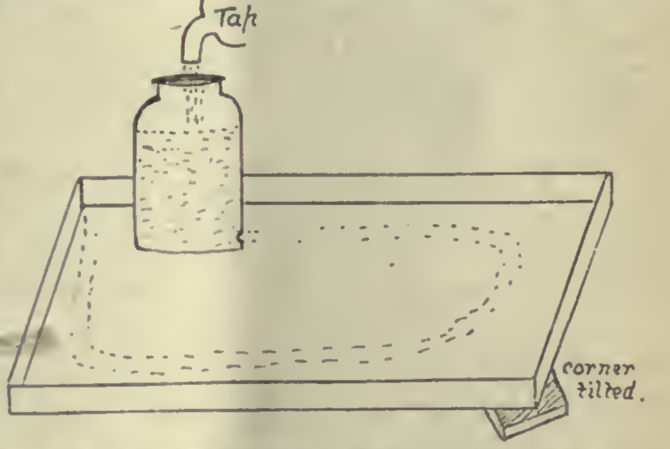
Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication

Washing in Trays.

This note may be of interest to assistants who want to make the best of the conditions of working that exist in their particular "shop." There are still to be found workrooms where batches of prints and negatives are washed in flat dishes or trays into which the water enters at the top, and flows out at the top. This method is only effective by constantly turning over the prints, and repeatedly emptying out all the water in a series of changes. The device shown was made by making a diamond cut on the side of a wide-mouth bottle at the bottom, and breaking the piece out by placing a stick inside at the cut, giving it a sharp tap with a hammer.

The bottle was placed at one corner of the washing tray, and the tap turned on until the inflow exceeded the outflow, thus gradually filling the bottle. When nearly full the inflow was reduced so that it corresponded with the outflow, thus keeping the bottle nearly full of water, and thereby slightly increasing its pressure at the outflow. The water enters the tray at the bottom, creates a circular motion, and flows out at the top. If tilted as shown in sketch the device becomes more effective.



This is not an automatic washer that does its work unaided, and it is very necessary to give a few complete changes of water, but it disturbs the hypo-laden water at the bottom of the tray and prevents prints from sticking to one another. A tin can could be used if the worker is not lucky enough to knock out a hole in a bottle successfully. A bag of flannel or swansdown pushed into the bottle and tied with string to the neck will make an excellent filter for trapping foreign matter.

This bag must be frequently rinsed out, and the contents will probably surprise the worker who imagines that tap water is free from iron particles, etc. Many of the failures in sulphide toning can be traced to foreign matter in the water. It will be noticed that this device acts as a non-splash, and prevents the noise of running water.—R. R. R.

Photo-Mechanical Notes.

Letterpress in Rotogravure.

Particulars are given in a recent specification (No. 109,968) of the process patented by the Société Anonyme la Photogravure Rotative, 96, Rue d'Assas, Paris, for the production of sharp letterpress characters in impressions from rotary intaglio plates.

Numerous experiments have shown that the jagged appearance of letterpress in the process is due to the screen and that if the screen be simply omitted for the letterpress engraving the ink runs and the print is blurred, which probably is a defect as bad as the jagging. But it has been found that if, in addition to not using a screen, the engraved parts for the letterpress reproduction be roughened, the ink does not run and very clear impressions are obtained from the engraving.

It has been proposed to produce from a plain negative of the original letterpress a positive copy printed through a screen having a transparent grain from which positive copy a print on sensitised tissue is made and transferred to the metal to be engraved. By such screen transparent points are produced on the positive, and these impart a corresponding grain, in hardened gelatine, to the sensitised tissue, which grain retards the etching at these points, and outstanding points are produced at the bottom of the etched cavities, these points tending to retain the ink therein. It has also been proposed to take a photographic copy of the screen and use that over the negative, and it has also been proposed to produce the same effect by photographically printing the screen on the sensitised tissue. It has been stated that by removing the screen during part of the exposure greater sharpness may be obtained.

According to the present invention the process of producing intaglio plates, or cylinders, for printing, is improved and simplified and a roughened surface is produced at the bottom of the parts engraved for letterpress printing, these results being obtained by applying to the plate or cylinder to be engraved a reproduction which has been produced without the use of any screen whatever, and by using for the engraving an etching or corrosive agent or the equivalent, which will produce the required roughened surface.

The engraving agent may, for example, be chromic acid and iron perchloride, preferably in the proportion of one part by weight of chromic acid to two parts by weight of iron perchloride, or any other suitable method of effecting the roughening may be adopted, for example, it may be effected by projecting thereon any suitable granular substance, by means of compressed air, after the manner of what is known as the sand blast.

By the process according to this invention instead of obtaining in the prints thick or deep black parts or a number of squares such as are produced in the characters by the use of a screen, and resulting necessarily from the spaces in the screen, there are obtained printed characters which are a deep black without jagging.

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Entries close September 3. Hon. Secretary, 5a, Pall Mall East, S.W.

October 14 to November 30.—Royal Photographic Society. Entries close (carrier) September 20; (hand) September 21. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

New Materials, &c.

Unisol Hypo-saver.—A liquid preparation, which in these days of liability to hypo scarcity is obviously assured of more than ordinary interest reaches us from Mr. G. W. Secretan 210a, Tufnell Park Road, London, N.7. It is issued as "Unisol," and is designed to effect economy of hypo by keeping the fixing-bath free from discolouration in use. It is added to the fixing-bath in the proportion of 5 drams to every 20 ozs. of the latter, and as we have been able to discover for ourselves is most active in preserving the fixer in a perfectly clean and clear condition. Whether Unisol contributes anything to the fixing powers of the bath—i.e., enables a given weight of hypo to dissolve more silver bromide (disregarding the question of stain) than it would without the addition, we are not able to say, nor does Mr. Secretan make this specific claim for it; but it is quite clear that in the new introduction the photographer has an efficient aid to economy in hypo equal in performance to the amidol preservative "Serteka," which Mr. Secretan put on the market some months ago, and which we were able to refer to in unqualified terms as to its satisfactory effectiveness for its particular purpose. "Unisol" is sold in 8-oz. bottles at 1s. 6d. (postage 6d.), and is issued with instructions for the fixation of prints by test, somewhat according to a system which we have many times recommended.

Diomet—White Band Amidol.—Users of the White Band Company's developer "Monomet" will hear with interest that the company has now placed in the market a British made amidol, which at first it is marketing as "Amidol—White Band," which name, as time goes on, will be gradually displaced by "Diomet," the registered trade name, which after the war will serve to mark the developer from other amidols of possible German origin. In present circumstances the established name is used in order that photographers may be under no misapprehension as to the character of the new introduction.

A sample of the developer which has reached us is a fine crystalline powder of light bluish colour, superior in this respect, so the makers claim, to pre-war German amidol, and denoting a higher degree of purity and better keeping quality in solution. Speaking from memory, the product certainly has the appearance of being more highly refined than the German amidol. At any rate, made up in the usual manner with soda sulphite, it produces an altogether admirable developer, yielding rich black prints on bromide paper. Moreover, the developer, in our experience, does retain its working qualities unimpaired for a longer time without the employment of the neutral preservative mixture of sulphite and meta-bisulphite, which some object to on account of the less rapid action of this form of the developer.

Broadly, however, our readers will congratulate themselves and the White Band Company on having an extended choice in their purchase of so popular a developer as amidol, by the addition of a further brand of this substance, which is made in this country from British material. The White Band amidol is sold at 40s. per lb., or 2s. 6d. per oz., and is obtainable from photographic dealers or from the Company, Progress Works, South Croydon, Surrey.

◆

X-Ray Paper.—Messrs. Illingworth and Co., Park Royal, Willesden Junction, London, N.W.10, send us a 12-page booklet descriptive of the new paper "Radioprint," just issued by them for X-ray negative making. The booklet contains reproductions of results by the new paper and is one which, we are sure, will be obtained and studied with interest by X-ray photographers.

Society of Master Photographers (Lancashire and District).—A general meeting of the above will be held at the George Hotel, Market Place, Preston (next to Post Office), on Tuesday, September 3. Chair will be taken by N. S. Kay, Esq., at 5.45 p.m. A very important agenda will be placed before the meeting, and, as matters vital to the interests of every photographer in the county will be discussed, it is hoped that every master photographer will attend the meeting. The committee will meet at 3.30, same day and place. All applications for membership (the subscription to which is 10s. 6d.) should be in the hands of the Hon. Sec., Mr. F. Read, 14, Balfour Road, Southport, not later than Monday, September 2.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SATURDAY, AUGUST 24.

Halifax Scientific Society. Outing to Thornton Moor.

TUESDAY, AUGUST 27.

Hackney Photographic Society. "Some Medalled Prints." W. Selfe.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A MEETING of the Council was held on Friday, August 12, 1918. Present Messrs. A. B. Basil, Gordon Chase, Alex. Corbett, C. F. Dickinson, Alfred Ellis, S. H. Fry, W. E. Gray, R. Haines, A. Mackie, Lang Sims, J. W. Beaufort, Frank Brown (Leicester), W. B. Chaplin (Windsor), T. Chidley (Chester), W. Illingworth (Northampton).

The application of the proposed Luxury Tax on photographs to commercial work was discussed, and it was agreed to take certain steps to endeavour to obtain a rectification of the schedule.

Upon the matter of the recent rise in the prices of plates the Hon. Secretary said he had had an interview with one of the leading manufacturers, and had been informed that there was only one manufacturer of glass of a suitable quality for plates in this country, and that the output, owing to various causes, was much curtailed. A great deal of the glass had formerly been imported, but now importation had entirely ceased. It was therefore a necessity that old negatives should be cleaned and the glass re-coated. Unless the plate manufacturers could obtain a sufficient supply some of them would have to close down, or at any rate greatly curtail their output. It was quite possible that plates would have to be rationed. The price of new glass at present was 1s. 9d. per square foot, which works out at about 5d. for a half-plate.

The Hon. Secretary was instructed to write a letter for publication in the "B. J.," pointing out the necessity for photographers to make arrangements accordingly.

A letter was read from a member asking whether conscientious objectors were allowed to be members of the P.P.A. The Hon. Secretary's reply was that when the Association was founded there was no necessity for making provision for the circumstances, and the question of retaining membership must therefore be left to the conscience of those members who profess conscientious objections to defending their country.

A letter addressed to a member by the Director of Photography was read, asking that certain negatives be loaned for the purpose of making prints for a national collection without charge and without acknowledgment of the photographer. The Council's view was that in no circumstances should original negatives be lent.

Two similar cases of members who had applied to the Director of National Service for licenses under the Retail Businesses (Licenses) Order, 1918, were referred to. As the Order specifically states that "no new business or new branch" shall be opened, etc., the Associations' solicitors' view was that the cases being removal only did not come within the Order. In one case the licence was refused, but on the solicitors' advice the member intended to remove without it. In the other, the reply of the local branch of the Ministry of National Service was that as long as he confined his business to photography, miniatures and enlargements no licence was required.

In a case of infringement of copyright, the Hon. Secretary had arranged a settlement on payment of £2 2s. damages.

Advice was asked by a member as to his position under the following circumstances. A demand had been made by the local police for a print from a negative taken in the ordinary course of business. The Hon. Secretary's reply had been that the copyright belongs to the customer; that to make a print in any circumstances except to the order or by permission of the customer was an infringement of his copyright. Neither the police authorities nor anyone else could authorise an infringement, and that no indemnity would be enforceable.

CROYDON CAMERA CLUB.

SOME short time ago the secretary received a communication from Mr. W. Foster Brigham, of Scarborough (at present not actively concerned with portraiture), saying that the Croydon informal session appealed to him as an invigorating element on which to launch a maiden lecture on "Two Saturday Afternoons with a Hand Camera." Being aware of Mr. Sellors' idiosyncrasy in announcing fixtures, he added that the gist of the matter had nothing to do with the title.

With the ever-present difficulty of filling the bill, such offers are most welcome, and should others be desirous of, say, a dress-rehearsal before an appearance at the R.P.S., doubtless Mr. Sellors would be glad to arrange an evening. So far as the outside public is concerned, the rehearsal could be kept strictly private, with no account of the proceedings to clash with the admirably condensed reports in the "B.J." of the R.P.S.'s proceedings. Care should be taken to allow a respectable interval between the two performances, for to turn up at Russell Square with one arm in a sling and a still-lingering "Oh. for a better 'ole!" sort of expression in any undamaged eye, would quite give the game away.

To revert to Mr. Brigham—although a Brigham Young in the lecturing business, it speedily became evident that, if he so chooses, a great and gratuitous career is open to him with photographic societies, and lucky will be those able to secure him, for he is one with ideas, and the ability to express them clearly and well. His actual theme dealt with that form of domestic friction due to amateur portraiture at home, with a hand-camera, which the lecture is bound to make more brisk, for when it comes to the oft-sought large head, the irresponsible amateur trying his fortune with a 5-inch lens on a quarter-plate, finds the experiment ultimately reacts, and subsides. True, Mr. Brigham employs a 7-inch lens on a quarter-plate, and is not audacious in a large-head line, but such details as these are apt to be forgotten in the fresh impetus imparted.

He first touched upon studio work, illustrating his remarks with a "modern" drawing of his own, representing the interior of a studio not on speaking terms with any known law of perspective. It appeared to be a "lean-to" one in every direction. In a studio, he said, one often fails to find fresh outlooks; on the other hand, the varying conditions under which home portraiture is undertaken arouses the sporting instinct and tends towards originality. The somewhat artificial appearance of studio portraits, he thought, is due to the unusual lighting. When working for amusement he much prefers an ordinary room, and generally prefers to amuse himself. On the question of "lighting," the lecturer expressed the most catholic tastes, and apparently takes things as they come, not worrying to alter existing conditions of illumination. He actually revels in dead front-lighting, and showed some highly-effective studies with excellent gradation and gentle modelling taken facing the light. These obviously bucked the incipient portraitists, who looked exceedingly pleased at the prospect of recording relations under such easily obtainable conditions, which pleasure, doubtless, will continue up to the time they endeavour to repeat Mr. Brigham's unorthodox procedure.

The lecturer then passed on to a lengthy consideration of composition in portraiture. It may fairly be described as one of the best and most practically useful contributions ever given in the club-rooms, with no inference that it embodied recipes for the synthetic production of art. An adequate reference to it is impossible without drawings. He next dealt with backgrounds, and pointed out that plain ones should always be stretched taut. Not quoting Mr. Brigham, many professionals disregard this sound advice, especially those of the fair sex, as every trade-printer is aware. A white background simulating streaky bacon is not the best for even vignettes. Dark backgrounds, he said, have had a long run, and by merging parts of the figure into the background much concentration is possible. Over-concentration may occur (N.B., bound to occur with some dials), but by introducing variety into the background, by aerograph work in the back of the negative, any over-concentration may be dissipated. Excellent effects are obtainable with curtains, and a graceful value can be given to folds, provided the curtains are looped. Panel backgrounds have been much in vogue in studio work, but, in his opinion, are often a delusion and a snare, though occasionally of service.

The lecture throughout was illustrated by many striking portraits taken by Mr. Brigham, including some fine nude studies of the feminine form divine. Not all married men are able to secure the necessary permits for this class of work from their wives, who often sadly lack a correct view-point for the classic in art. A most hearty vote of thanks was accorded the lecturer with such acclamation.

News and Notes.

War Honours.—Captain W. J. S. Baird, R.F.A., who has won the Military Cross, is the only son of Mr. Andrew H. Baird, scientific instrument maker, Lothian Street, Edinburgh, and was educated at George Heriot's School and Edinburgh University. Captain Baird was in charge of the battery waggon line, when hostile infantry suddenly opened with machine-guns and rifles at short range. He displayed great ability and resource in getting all away to a place of safety, and subsequently in maintaining touch with his gun line under difficult circumstances.

Industrial Reconstruction Council.—An important series of conferences and discussions is announced by the Industrial Reconstruction Council to be held at 6 p.m. in the Hall of the Institute of Journalists at fortnightly intervals, alternately with the lectures at the Saddlers' Hall, of which particulars have already been published. The first of these will be opened by Mr. Robert Wilson, of the Ministry of Labour, on Tuesday, September 10, with an address on Works Committees. On September 24 the subject will be Trade Boards and the speaker Mr. J. J. Mallon, of the Anti-Sweating League. The other conferences will deal in turn with Interim Industrial Reconstruction Committees, The Place of Conciliation and Arbitration in the Whitley Scheme, Women in Industry, The Trade Union of the Future, Functions of Industrial Councils, and Restriction of Output, the opening address in each case being delivered by Mr. W. Henderson Pringle, of the Ministry of Reconstruction, Mr. E. H. C. Wethéred, Miss Lilian Dawson, Mr. George A. Isaacs, of the National Society of Operative Printers and Assistants, Mr. E. McGegan, of the Ministry of Labour, and Mr. Wilfrid Hill, of Birmingham. No tickets will be issued, but all those who intend to be present are asked kindly to inform the Secretary, I.R.C., 2 and 4, Tudor Street, E.C.4, who will be glad to send a full prospectus of the series on application.

A Bogus Photographer.—At Rhyl, Robert Thomas Williams, collier, 9, New Hall View, Brynfields, Ruabon, pleaded guilty to obtaining 2s. by false pretences from a visitor at Rhyl.

Police Constable Millington said the prisoner went to Rhyl for a holiday. He knew nothing about photography, but spent 11s. on a film camera, and on the sands thought he would make a little money. He invited visitors to have their photographs taken at 1s. for six. Six parties paid him money, and when a visitor named Whitehouse asked for his place of business he said he had a studio in High Street, Rhyl. Mr. Whitehouse paid him 2s. for two groups, but, being suspicious because of the smallness of the camera, communicated with the police. The prisoner told Police Constable Millington he had a business at 94, High Street, but as that was a café the constable called for his home address. He then said he was Thomas Willoughby, photographer, 94, High Street, Wrexham. He produced a list of the people from whom he had taken orders, but as he could make out only one the constable arrested him and he then confessed.

The police had had the films developed, and when these were produced, the Magistrates' Clerk remarked that it was evident the prisoner knew very little about photography. There was not one of the pictures complete or straight, and several overlapped.

It was stated that the defendant was in poor health, and that he had lost his wife and mother within 12 months.

Defendant, who had £3 9s. 10d. when arrested, was fined £3 1s. 6d.

High-speed Photography.—Sporting events is the subject of an article which Major Adolphe Abrahams contributes to the August issue of the "Strand Magazine." In answer to the question, Which is the most difficult sporting event to photograph? he writes :—I will bracket as equal the successful attempt to show an amateur dislodging a tent-peg and a man being bowled at cricket. I say amateur advisedly, because a crack professional soldier can perform the first feat with almost infallible accuracy, and the shutter can be released with the certainty of obtaining a good photograph. The amateur may or may not hit the peg squarely, and so one must not make the exposure until the peg is actually seen on the lance, and this leaves precious little time for decision. The cricket photograph exhibits much the same sort of difficulty. Unless you adopt the impracticable procedure of photographing every ball sent down, you cannot anticipate the fall of a wicket with any individual ball. I had the remarkably good fortune of securing in two consecutive exposures two almost identical pictures of falling wickets, a piece of luck I should not expect to encounter twice in a dozen lifetimes.

In cricket there is an additional difficulty. No position close to the wicket can be regarded as affording reasonable safety, and the anxiety of avoiding damage to yourself and *a fortiori* to your valued apparatus does not encourage the *sang-froid* essential to perfect high-speed photography.

There is, however, another way to photograph at cricket, and that is to employ the wonderful telephoto high-speed camera invented about eight years ago. This apparatus enables you to stand eighty yards off, or even farther, take your observation through a little prismatic telescope on the camera, and thus in perfect comfort and safety obtain pictures perhaps from the top of a pavilion. These "bird's-eye views" have a peculiar foreshortened appearance, but their photography possesses all the fascination of big-game shooting—indeed, the method has been applied to the photography of wild animals in nature—with none of the dangers.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

⁂ *We do not undertake responsibility for the opinions expressed by our correspondents.*

SALE OF OLD NEGATIVES.

To the Editors.

Gentlemen,—Regarding the recent advance in plates, and the manufacturers' stipulation, viz., the return of 75 per cent. of old negatives, your correspondent "Old Pro." is evidently one of those who disposed of his negatives to the almost innumerable firms who have been canvassing the country.

Even here in Ireland we are pestered with them, mostly "service dodgers," and I would strongly advise pros. to show them the door. If we are to dispose of plates at all, surely the fairest way is to sell back to the manufacturers of the plates we use, although we might think the price offered is too small. Cannot the P.P.A. do something to obtain for us a more equitable treatment.—Faithfully yours,

Londonderry, August 17. E. G. Harries.

THE ADVANCE IN THE PRICE OF PLATES.

To the Editors.

Gentlemen.—Some of your correspondents appear to think that the plate-makers have formed a "ring" in order to run up prices, and suggest that competitive plate-makers should be encouraged after the war.

Allow me to offer a suggestion that appears to me to suit present conditions. Why should not a number of leading photographers combine to form a plate-making company of their own? Let them obtain suitable premises, engage a first-class emulsion-maker, etc., and then they could send their surplus plates to be re-coated by their own employees. This method would ensure what I may call a "standard" plate. There would be a uniformity of production so far as plates were concerned, and if any profits were made they could be co-operatively shared either in dividends or otherwise, as their committee might determine.—Yours faithfully,

Church Lane, Ledbury, August 18, 1918. Thomas Lyons.

[A company on these lines has already been formed under the name of the New Era Plate Co.—Ed.]

To the Editors.

Gentlemen,—I was glad to notice through the letter of Mr. Mackie in your columns that the Professional Photographers' Association had been considering the rise in the price of plates. But, after all, this manifesto of the Council tells us nothing we did not know before. We are all aware of the shortage of glass and of the need of economy. Will the Council go a little further, and give us their opinion on some matters on which they ought to be better informed than the body of the profession. May I venture to ask, through your columns, their opinion on the following matters :—

(1) Do they consider, after taking everything into account, that the present rise in the price of plates was necessary, and if so, on what grounds?

(2) Is the price offered by the plate-makers for old negatives in their opinion a fair and reasonable one?

(3) Will they also tell us how the profits of the various limited companies of firms making plates compare now with the profits they were making before the war?

(4) Will they tell us whether the Council of the P.P.A. is taking any steps to protect the profession in these matters? As photographers we are unfortunately well aware that there is a plate-makers' association, under whose heel we are, unfortunately, at the present time. We would like to know what the P.P.A. are doing to help us. Apologising for taking so much of your space, I am yours, etc. A Country Photographer.

To the Editors.

Gentlemen,—Owing to the rapidly increasing prices of above, in addition to the high cost of living, it is becoming a serious matter for the profession to arrange their charges to their clients. Photographs being a luxury, the public will not buy so freely when they find the charges are somewhat higher. If in each town the local photographers formed an association and rented suitable premises, from which all members could be supplied with goods as required, it would be of great assistance; also to fix a minimum charge for photographs. This would enable photographers to make a decent margin of profit and buy their stock for cash, besides selling supplies to the public from the depôt. The *manufacturers and wholesalers would be paid more promptly*, and the photographers would have the benefit of any surplus profit accruing from the sales. There would then be no necessity to purchase a large stock in advance and embarrass oneself, when one could, from a distributing depôt, just obtain what was required at the moment. If there had been a distributing centre in this town no doubt a very large supply might have been purchased and thus saved recent advances; but whilst such increase would have been charged to the professional buyers, the photographers would have themselves gained in the end by participating in the profits at the year's end. Another matter might have been dealt with—that of used plates; they could have been returned to the distributing centre and sent to the manufacturers from there, thus saving the local members trouble of railing them off separately. As further large increases are likely to occur in the next few months, it is hoped that the profession will consider amongst themselves the best way of economising, etc.—Yours faithfully,

Hull.

August 18.

To the Editors.

Gentlemen,—It is quite conceivable that the plate makers are confronted with difficulties regarding supplies which makes some action on their part imperative to conserve them, but surely they could have accomplished this without adopting the drastic and obviously unfair methods they have. If ever the harsh voice of monopoly has made itself heard it has done so in this case, and it is the knowledge of the strength of the combined organisation that has made such a declaration possible that constitutes for the photographer the hopelessness of obtaining relief from these iniquitous conditions. In despair he can turn from one source of supply to another, only to find each and all cuckooing to the same note.

But my object in writing was not for the purpose of complimenting the gentlemen who have done us the honour to exploit us, but to suggest some method by which, as a profession, we can shake off the stranglehold they are endeavouring to impose. At the present time they have the wealth, fortified by Government contracts and free access to all the markets available. What, then, is the remedy? As far as I can see, the best plan would be for all photographers to band themselves together, and become affiliated with the Labour Union. This is the strongest force at present, industrially speaking, and commands the ear of the Government. It is the only one I know capable of matching wealth against wealth and influence against influence to secure fair and equitable arrangements. Perhaps this suggestion would not appeal to all photographers, and better ones may be advanced. At the moment nothing more likely to prove satisfactory occurs to me. Beyond that the situation demands immediate readjustment. The letters in your issue of to-day indicate the feelings that have been excited. Now is the time to grip the nettle boldly and destroy the influence by which we, as business men, are menaced. Otherwise it might be too late, and then our lot would be intolerable.—Yours truly,

Justice for All.

To the Editors.

Gentlemen,—I am pleased to see several letters in the current number of the "B.J." *re* the new rise in price of plates, and the arbitrary conditions regulating re-orders. I do not like to think so, but must admit that unless the makers can prove by reduction of their dividends, etc., that they are doing badly, owing to present conditions, this new advance looks very much like a case of "profiteering." I do not deny that there may be a very serious shortage of glass, and that such a position may call for drastic measures to be taken, but if such is the case would it not have been more fair and just if the makers had approached the professionals and dealers and discussed the matter with them? I am sure had that been done and the shortage proved, that the latter would have been quite willing to co-operate with the former, and to do all in their power to meet the situation. The essential thing would have been that the plate-users felt that they were receiving fair and just treatment in return for co-operation, because at present that is what I think all feel we are not getting, as prices have been advanced more than appears necessary, they having risen nearly 400 per cent.

The circular on the face of it does not appear by its conditions to show a desire on the part of the makers to seek co-operation, but rather it takes the form of an "ultimatum," based on the lines "No returned glass, no fresh supplies." It is urged that the shortage of glass is the cause; that may be the basis, but my opinion is that is is not the *real* cause, because if it was then the terms would be more fair.

From an argumentative point of view. Supposing the glass is the real crux of the matter, then it follows that the glass must be very valuable. That being proved, is 7d. per dozen for ½-plates (which works out at 1-14 of the price of the same plate sensitised) a fair price? From this price carriage has further to be deducted.

Again, why are varnished negatives refused, if glass is so needed; because plate-makers have bought them up till the issuing of this new leaflet.

I think these two arguments alone are enough to give us cause for feeling that the "glass shortage" is an excuse for further "squeezing" the users.

If the new conditions are carried out, what is to happen to the professional who for various reasons has not got the necessary 75 per cent. of area to return? Again, how are dealers to collect such a large percentage from their customers?

There is one more point I should like to mention, and it is this: If the makers are allowed to dictate these terms, what is to prevent them in three months' time issuing another leaflet, stating that in future they will only be able to allow half the amount previously paid for returned glass?

In conclusion, I would again repeat that if the makers really have a good case, the position could be best met by co-operation, when I am sure that, if fairly treated, all professionals and dealers would be willing to help to the uttermost.—Yours faithfully,

August 17. Professional and Dealer.

SUGGESTED SUBSTITUTE FOR PLATES.

To the Editors.

Gentlemen,—Now that ordinary films are practically unprocurable and the price of plates is so high as to put them out of reach of the ordinary amateur, a good field is surely open for a new enterprise. The question is: Where can we find a cheap substitute for films and plates? Now, some eighteen or twenty years ago there was placed on the market what, if made to-day, should prove a very satisfactory article. It was called the "Secco" film, and was sold at a much lower price than plates, even then. It was a film with a paper base; and after being developed, fixed, washed, and dried, the paper was easily detached, and a beautifully thin, transparent, and tough film was the result. Somehow it did not become popular, the chief fault—it was just in advance of the times. In those days most photographers judged the density of their negative when developing by looking through them. With the paper backing this, of course, was impossible. Hence the disfavour. To-day, however, with the thermo and factorial systems of developing—thanks to the pioneer work of Mr. Alfred Watkins and others—this obstacle is entirely removed, and such a film as the "Secco" should stand a splendid chance, especially in cut sizes, to be used in plate cameras. If it should be that any similar film is made to-day, I am sure photographers generally would be glad if the manufacturers would announce the fact in the advertisement columns of the "B.J." If not, is there no manufacturer who can see money in the idea? W. G.

Hereford, August 16.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

Well-a-way.—We have no idea what the preparation contains, but we can certainly confirm the claims which the vendor makes for it.

A. E. T.—Messrs. Raines and Co., Ealing, or Mr. S. H. Fry, 5, Highbury Grove, N., both doing the highest class of work for the trade.

L. M. King.—The best book is "The Science and Practice of Photography," by Chapman Jones, which our own publishers can supply, price 5s. 6d., post free.

T. T. P.—We thought we made it clear that we treated the processes as of experimental interest, not of a kind to be recommended for regular practice, although some of them, *e.g.*, that of Mr. Soar, have been used for commercial work.

Chatham.—We think you will be unwise to oppose the proposal, which is really quite reasonable. The sitter, as you should realise, is within his rights, and if he liked to take the matter to the County Court would undoubtedly get judgment in his favour.

Extra-Rapid.—It is not likely to be worth the trouble. You can get as rapid orthochromatic and panchromatic plates as you need, but if you want to try, the best thing is to apply for the sensitising dyes to Messrs. Ilford, Ltd., who will probably be able to advise any special sensitising formula.

H. Howard.—Judging from the negatives there is nothing the matter with the lighting: the hardness is simply the result of over-development of the plates, coupled with the use of a gaslight paper. Try bromide paper with the present negatives and stop short of such full development in future.

Engineer.—If you must have positive (*i.e.*, white ground) copies, the most direct processes are the ferro-gallic and the Pellet. The latter is the more rapid in printing and gives the finer results, but it is hardly suited to unskilled help, whereas you could soon get your lad to use the ferro-gallic paper.

L. P. W.—Impossible to express any opinion worth your having without seeing the agreement and knowing the locality, but a reasonable restriction as to an assistant starting a business of his own is quite usual. Whether it is fair in a particular case depends on the circumstances, and those you do not indicate.

Park Empire.—1. Not far enough, in our opinion. You need to be at least fifty miles away in order not to feel the influence of the London firms, and even at that distance you are bound to feel it in the case of wealthiest residents. 2. Nothing derogatory in the commercial work, and most certainly possibilities in it if you are in the neighbourhood of several factories.

Amidol Stains.—Which is the best way of removing amidol stains from clothing, having had the misfortune to have had some splashed on to a new overcoat by someone? The amidol was composed of 4 ozs. sulphite soda and ½ oz. of amidol (Johnson's). Petrol, and also salt of lemons have been tried for removing the stains, but with no effect.—P. C.

We know of no means of removing amidol stains from cloth. Usually the only remedy is to have the clothing dyed to a dark colour, which will mask the stains more or less completely.

Water-colouring.—Can "Kodina" or any bromide or gaslight paper be treated in any way so that they will take a water-colour wash in the same way as matt surface platinum or Palladiotype? In the latter papers the wash sinks into the paper in the same way as a water-colour sketch without photographic basis, and I want a photographic paper (not necessarily gaslight) which will be the same in this respect as two above-mentioned processes.—X. Y. Z.

We do not see how you can obtain the effect you seek with any emulsion-coated paper.

Copyright.—I have a drawing by me that I might like to copy. It was drawn about 35 years back at one of the performances of Maskelyne and Cook. The artist was the automatic figure Zoe; the audience selected the subject, and the figure drew it. Who is the author?—M. A.

In all probability the sketch is a copy of some previously existing portrait, which would be copyright, hence you could not safely copy it. If original, the copyright would be vested in the person who directed the machine.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less	1/-
Extra words	1d. per word.

(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

"Box No." and office address	charged as 6 words.
For forwarding replies add ...	6d. per insertion for each adv't.

If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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SUMMARY.

In a leading article we refer to some of the things which should be regarded as essential in the fitting of a dark-room, namely, availability of full daylight, provision of a sink of size to take not only fixing baths, but also one or two washing dishes, and lighting of a kind appropriate to the handling of either negatives or prints. (P. 391.)

A note on a suggested procedure for avoiding copyright disputes in the case of "extra positions" taken after an ordinary sitting is given on page 389.

Following upon a previous article in the "B.J.," a design for an improved enlarging lantern, in which the condenser is dispensed with, and focussing to size greatly simplified, appears on page 393.

An article on commercial photography, on page 394, gives some useful advice to the ordinary photographer who is not quite *au fait* with this class of work.

A study in the psychology of securing orders for photographs, with a system by which it is claimed that the prospective customer is worked up to the purchasing point, will be found on page 392.

Making the best of an apparently uninteresting order, and what resulted from careful treatment of the subject, is detailed on page 390.

Under the heading of "Correspondence" there is a suggestion that an easily-stripping dry-plate should be put upon the market, so that returning the glass to the maker would not involve the destruction of the negatives; also further letters on the recent increase in the price of plates. (P. 399.)

Lens fog as a cause of flatness in certain classes of studio work, and hints as to its avoidance, is dealt with on page 390.

We may hope that after the war the local view trade will revive, and that new and attractive subjects will take the place of many of the out-of-date pictures which are now on sale at popular resorts (P. 389.)

A method of making a photographic pinhole, with some very useful data as to exposure, subject, and plate-speed when using this substitute for a lens, is described on page 388.

Ignorance of the Defence of the Realm Regulation was held to be no excuse in two cases of carrying a camera in a prohibited area, reported on page 396; while in another case of attempting to photograph near an aerodrome a lad was fined a small sum and his camera forfeited. (P. 399.)

A method of producing relief prints upon a modelled plaster support is described under the heading of "Patent News" on page 397.

Photographers who have a large accumulation of tins which have contained platinum and other papers will find on page 398 that there is now a market for what was formerly considered lumber.

EX CATHEDRA.

Local Views. Recent news gives hope that in a not very distant future we shall be able to turn our attention to home affairs again, and to try to pick up the broken threads of many of our minor industries. Among these may be classed the photographic post-card trade, which has been sadly interfered with by the war. Instead of local views, folk have been sending lithographed or engraved cards bearing upon the war, or carrying sentimental messages, which is quite what might be expected, and as it should be. In the future we may, however, hope for a revival of the view trade, and we trust that due attention will be given to the quality of the cards when the time comes to take new negatives. The prevailing fault of the shopkeeper seems that he is more influenced by price than by any other consideration, and that unless he goes in for collotypes, he is ready to take the poorest specimens of photography to save a shilling a gross. To secure any improvement in quality, it would seem desirable that the penny card should no longer be a leading line. The war has pretty well knocked out the penny as the great purchasing unit for trifles, and with a twopenny card there is the possibility of using better materials, of getting more artistic views, and of keeping the subjects well up to date. It is to be hoped that in the future publishers will support the British collotype printers, and not send any work out of the country, if it can possibly be executed within it.

* * *

Copyright in Extra Portraits. The photographing of a sitter in circumstances which are a kind of half-way house between those of an ordinary and those of a "free" or invitation sitting is a piece of business which a photographer now and again will undertake with the object of securing copyright in a portrait. We refer to the practice of asking a sitter's consent to the making of an additional portrait after the plates used in carrying out the sitter's order have been exposed. In these circumstances, if it is desired to make sure of ownership of the copyright, it is necessary to exercise some discretion, otherwise in the event of a dispute it may not be such an easy matter to prove that the copyright is vested in the photographer, not in the sitter. It is quite natural that while giving consent to the arrangement the sitter should wish to see a proof, in which case the photographer should send with the proof a letter (of which he keeps a copy) stating that the photograph is satisfactory to him, thanking the sitter for the opportunity of taking it and expressing the hope that there is nothing about it to which the sitter can object—in short, making it clear that the photographer is the person to be satisfied, and that the proof is submitted to the sitter simply as a matter of courtesy. A further measure is to present the sitter with a print marked "Copyright, So-and-So." By following such a course there is no difficulty in establishing ownership of the copyright apart from verbal evidence, even though copies of the portrait may be supplied to the sitter.

* * *

Lens Fog. It is often found that there is a general veil over negatives, to which it is difficult to assign a cause. All conditions may appear to favour the production of bright negatives, yet foggy results occur occasionally. This is especially the case when making sketch negatives, and here the cause is easily located. It is, in the majority of cases, due to a too successful system of lighting the white background, whereby a flood of diffused light is reflected into the lens. The trouble is due to illumination of the open glass surfaces of the lens, and also of the interior of the camera. Much may be done by using a lens hood carrying an opaque mask, which allows only as much of the background as is needed for the negative to fall upon the ground glass, but if this precaution be found insufficient the illumination of the background must be reduced and opacity secured by the red-ink blocking out suggested by Mr. Spencer Adamson. A somewhat similar fogging often occurs when making "Rembrandts." In this case, however, it is due to direct light from the window entering the lens, and this may easily be blocked out by means of the ordinary head screen or even by a small background. All that is necessary to be done is for the operator to put his head exactly in front of the lens, and then to move the screen until all direct light from the window is covered. As the screen may be quite near the lens there will be no interference with the lighting of the model. All that is necessary is to see that it is not included in the negative. Of course, it is assumed that the lens is always kept free from dust or smoke; a dirty lens will nullify all attempts to secure bright negatives.

* * *

The Art of Copying. In most studios "copies" are looked upon as a sort of necessary evil, the originals are allowed to accumulate until some of the owners begin to get impatient, when the junior assistant is put on making the negatives. Now this is quite the wrong view to take of this class of work, and results in its not being a well-paying line. If anyone will take the trouble to get the best possible results, good prices can be obtained, and orders far in excess of the customer's first idea may ensue. An actual recent instance of this may interest those who look askance at copies. The only portrait of a deceased officer was in the form of a rather coarse half-tone newspaper illustration. The original was lost, and the block was destroyed, so the relatives sought a photographer and asked him to make some copies of the newspaper cutting. He copied it carefully, eliminated the cross-grain as far as possible, and produced an excellent sepia platinum print. This being approved, he suggested an ivory miniature, which was at once ordered, and when this was delivered came another order for a 15 by 12 head finished in oil, the bill for the whole being over £15. A photographer with less imagination would have copied the half-tone in a straightforward way, and perhaps earned half a guinea. The customer might have been satisfied that he had the best that could be done in the circumstances, but he would never have got such an exalted idea of the photographer's cleverness as in the case just quoted. It is not merely the one order which has to be considered; a *tour de force* of this kind is talked about, and other people who want portraits copied come to the man who proves that he can do them well.

SOME ESSENTIALS IN THE FITTING OF THE DARK-ROOM.

In the fitting up of fresh premises for a photographic business of moderate size many photographers, so we still find, experience a difficulty in breaking away from the old tradition according to which the dark-room was often the smallest and the worst ventilated room which could be found in the place, and often provided exactly the conditions for the production of defects in plates and negatives which would be laid to the charge of the manufacturer. It is surprising that masters of studios should still expect work to be done well and cheerfully in places which are so ill adapted to the convenience and comfort of their assistants. A reasonable amount of space is one of the first essentials in a dark-room; it is tiring to work in close quarters, for, apart from the bad effects of faulty ventilation, the constant necessity of moving and working with the care which is imposed by a confined space constitutes a strain upon the worker. On this account there is every good reason for having the dark-room of ample size. It is then practicable to carry on work in one part under illumination which will not interfere with the handling of more sensitive materials in another part, whilst the freedom of a decent working space largely reduces the degree of fatigue consequent upon continuous hours' employment in the dark-room.

Apart from this general desideratum, one of the first essentials in the fitting up of a dark-room is that on occasion it can be flooded with full daylight. Cleaning up after a batch of work and the regular cleaning which a dark-room should have every week or so can only be satisfactorily done by daylight. Of the various methods for readily admitting daylight there is none better, in our experience, than a double blind running in a frame which is fixed right over that of the window, and which provides a trap for any light creeping round the edges of the blind. Messrs. Sinclair have specialised in the supply of a frame of this kind, and no more convenient form of it could be imagined, although no doubt the man who is handy with tools will find no difficulty in making a similar arrangement for himself. Two separate blinds are necessary, for the reason that no single thickness of material can be depended upon to be sufficiently free from pinholes as to ensure complete exclusion of light. In the Sinclair contrivance one of the blinds is of ruby material, but we think it is just as well to have both the blinds black, for in these days of the almost exclusive use of development papers, it is a mistake to rely on the varying strength of filtered daylight for the illumination of the dark-room. Moreover, the fixed position of the window in a room, if the window is to be used as a source of ruby or orange illumination, greatly limits one in arranging the working benches in the most convenient way.

A point which, we think, comes next in importance is the provision of a sink of large size to take the tanks or dishes used for the fixing of negatives or prints. The sink should be of such size that plates or prints can be transferred from the fixing bath to the first wash water without removing them from the sink. According to this plan, the floor of the dark-room will be kept free from splashes of hypo, one of the most fertile causes of spots and markings on either description of sensitive material. If prints are handled at a different bench from that on which negatives are developed, then this also should be provided with its large sink in line with it for the accommodation of the print-fixing bath or baths. In the case of that for negatives, an essential fitting, in our judgment, is a lamp projecting slightly over the sink, and adapted for yielding diffused white light when it is required to examine negatives after fixing. This lamp may be of the very simplest description—a box having a front measuring about 12 by 20 ins., and fitted with a sheet of opal glass or a couple of thicknesses of ground glass. If electric light is used, its illumination is a very easy matter; whilst if gas is the illuminant, a Bijou inverted burner will give ample illumination, and may, in certain circumstances, to which we refer in a later paragraph, be placed outside the dark-room. At any rate, let there be the facility for examining each negative, as it comes from the fixing bath, by transmitted light without there being the occasion to carry it to another place in the room or to the daylight outside, and in so doing to contaminate the floor with drippings of hypo solution. A drawback which certainly attaches to a large sink is the water which is bound to collect on the bottom of it, and which thus tends to make the room very damp. This may be got over by placing the sink slightly tilted towards the outlet, and providing it with a slightly angled false bottom in the shape of a grid, upon which dishes, etc., can be conveniently stood. This plan enables the sink to drain almost dry after use, whilst it does not interfere with the occasional employment of the sink for washing a large batch of prints, or even for the development and fixing of an enlargement of altogether unusual size, the usual plug for the outlet being replaced by one which permits an inch or two depth of water in the sink and allows any water above this depth to pass down the outlet. The wooden grid also obviates the liability to breakage of measures or dishes which may be accidentally let fall on an earthenware sink, whilst in the case of smaller sinks, which it may be considered satisfactory to set level, the same degree of prevention of breakage may be secured by the use of a mat of rubber or thin lead on the floor of the sink. One or other of these arrangements is, we think, preferable to the use of lead sinks, which are much more difficult to keep clean, and are not altogether free from trouble in the way of leakage.

In the fitting of benches at which the development of plates or prints is done, a large measure of comfort is secured by surfacing the bench with good thick first-quality linoleum, which will last for years, and is made perfectly clean after the day's work has been done by going over it with a cloth. It is not a bad plan to nail down a narrow fillet or beading of wood along the front and back edges of the bench, in order to prevent any developer or other solution which may be spilt from running down the sides. Another plan to the same end, which we have used ourselves and have noticed in dark-rooms from time to time, is to make the top of the developing bench on a slant towards the sink which forms a continuation of it. In order to provide a level top the bench is provided with a wooden grid, supported at the lower end of the bench—*i.e.*, that next to the sink—with a cross bar which just brings the top level. Thus any solutions which are spilt drip through the grid and find their way down to the sink. A grid of this kind should be made of stout wooden slats fairly close together, that is to say, not more than half an inch apart, and it is well to give it two or three coats of linseed oil varnish in order to make it waterproof and impenetrable by the developing solutions. Shellac varnish is useless for this purpose, as it is attacked by the alkali of a developer, and then becomes soft and sticky in places.

As regards the lighting of the dark-room, the photographer who has electric current at his command naturally finds his task of providing the most comfortable and convenient illumination greatly simplified; but, whatever illuminant is used, the endeavour should be made to provide a working bench which is used for both negatives and prints with two separate lamps—one (for negatives) with the safelight in an upright position, so that the negative can be conveniently held up in front of it, and the other (for prints) with the safelight horizontal, so that a flood of the requisite illumination is thrown straight down upon the developing dish. With electric light, the horizontal type of lamp is, of course, quite easy to contrive; with gas, it requires a little ingenuity in fitting a box with a safelight between glasses and a short distance above it a compact form of inverted incandescent lamp. While we are upon this subject we may refer to the question of considering the design of a dark-room in the first instance in reference to the compulsory use of gas as an illuminant. If it can be arranged, it is obviously of advantage to have the gas burners placed outside the dark-room, and if a room of fair size is available, this may be most conveniently done by partitioning off a part of the room with match-boarding for the developing and other operations, arranging the developing bench, sink, etc., where light is chiefly required, along the length of the partition. The necessary gas burners can then be placed on the outside of the partition, and, if provided with by-passes, can be entirely controlled from within the dark-room. This arrangement consumes some extra space, but as a rule the portion of the room outside the partition can be very well utilised for such miscellaneous operations as intensifying, clearing or reducing negatives as require to be done by white light.

There is only one other point to which reference may be made in these general notes, and that is the desirability of the dark-room being without a door. In any business where several assistants require to work in the dark-room, it is a considerable economy if entrance to and exit from it can be effected without admitting white light. While a pair of doors, one opening in one direction and the other in the other, with sufficient space for a person between the two, can serve for this purpose, it is a somewhat fallible method, since one can never guarantee that an assistant will close the first door before opening the second. Where the arrangement of premises permits it, a much more satisfactory plan is an open doorless zig-zag entrance-way to the dark-room, such as may be devised by a matchboard erection, with the inside surfaces of the entrance painted a dead black. This, again, is an arrangement which requires a fair amount of space to carry it out, but it is one which it is worth while to adopt, if circumstances permit, not only on account of the prevention of waste of time, but for the sake of the improved ventilation which the open passage-way affords.

Internment of Enemy Aliens.—In the list of the first batch of internments issued by Mr. Justice Sankey's Advisory Committee last week appear the following names:—Paul Joseph Heinrich, residing at Belsize Road, Hampstead, late director of Carl Zeiss; Peter Moll, photographer, Palmer's Green; Fritz Boehm, chemical manufacturer, Sudbury Hill, Harrow; and Oscar William Flaminger, art publisher, Cricklewood.

False Pretences.—At the Bow Street Police Court last week, John William Burton, alias Frederick Charles Hewlett, aged twenty-one, was charged with larceny.

It was stated that in July prisoner went to a shop in Charing Cross Road, and, describing himself "Lieutenant Burton," purchased a camera, a box of plates, and some extra slides, value together £8 7s. 6d., promising that if they were sent to him at the Horse Shoe Hotel, Tottenham Court Road, he would pay on delivery. The goods were accordingly sent by a messenger, who, arriving at the hotel, was intercepted by the prisoner, who said to him, "Wait here in the billiard-room whilst I take the parcel into the office to get some change to pay your bill." The messenger waited a long time, but prisoner never returned. When arrested later he admitted stealing the things, and said he sold the camera in a shop somewhere in the West End for £3.

Prisoner pleaded guilty, and was sentenced to six months' hard labour.

THE SCIENCE OF SALESMANSHIP.

(An address before the Ohio-Michigan-Indiana Convention of Photographers by Mrs. Mabel Cox Surdam, of Toronto, as reported in "Abel's Weekly.")

Sow a thought, and you reap an act,
Sow an act, and you reap a habit,
Sow a habit, and you reap a character,
Sow a character, and you reap a destiny.

To-day I desire to sow the thought of salesmanship.

Do you sell photographs because you know the science of selling, or do you sell them when a patron requests you to make a picture? By the science of selling, I mean have you so studied and analysed your selling methods, that you can lay down definite rules, and principles? If so, then your knowledge has become a science.

Years ago, were you a successful salesman of photographs, it was thought you were lucky, or born a receptionist. In fact, in some studios, this thought has not entirely disappeared even to-day. There is no question but that some of us are born with a greater natural aptitude for salesmanship than others, but a natural aptitude for salesmanship, undeveloped and untrained, is of as little value as an exposed plate undeveloped. You must be a keen observer, have a knowledge of human nature, and use that knowledge to the best advantage and obtain an order.

To-day we realise all salesmanship is upon knowledge; knowledge of yourself, knowledge of human nature, knowledge of the photographs you sell, and the knowledge of interesting a customer and closing a sale.

Success in photography depends largely upon four things: Your buying, your cost of production, your personality, and your efficient selling. Carelessness or bad judgment in any one of these will eliminate profit and cause failure. I ask you to guard most carefully the last two:—your personality and efficient selling. Photographs seldom sell themselves, and competition is daily growing keener, and with this increasing keenness comes the intense struggle, first to obtain customers, and then to keep them. You may be able to make the most beautiful and artistic photographs imaginable, but, if you cannot sell them, what does your art avail you? How many of you know the definition of salesmanship? The answer is persuasion, and consists of the elements:—

First, yourself.
Second, your proposition.
Third, the other person's mind.

Let us take these elements and consider them. *Yourself*:—In yourself, the power of persuasion depends upon the development of the powers of your body—intellect, feeling and will. The more powerfully your mind works, the greater is your power to influence the minds of others.

Your Proposition.

In order to know your proposition you must study and analyse it, and be able to tell your prospective patrons about it. Since people must believe what you say to them, in order to be convinced and persuaded, you must cultivate not only your inherent honesty and truthfulness, but the frankness, candour and naturalness that impresses those who see and hear you with reliability.

The Other Person's Mind.

You must be able to see your proposition with his eyes, think about it with his mind, and talk about it with his satisfaction and advantages in mind.

Efficient salesmanship is based upon fundamental principles which are general, and underlie the successful selling of all photographs.

Let us analyse these.

First, introduction.
Second, attention must be attracted to photographs.
Third, interest must be aroused in photographs.
Fourth, interest must be intensified to desire to have photographs.
Fifth, desire must be changed to decision to have photographs.

First, the introduction.—The approach of the patron to the receptionist. At this time the receptionist should size up the patron as to character and temperament, which are usually portrayed in the face and carriage, and make a decision as to which method will be most effective in securing an order. Scientists tell us there are three distinct types of character. These we must know.

1. The Motive Type.—Persons with oblong faces, high cheek bones, large bones and bodies showing a tendency to angularity. The neck is long and set upon broad shoulders, while the chest is moderate in size and fullness. The figure is usually tall and striking, but not always elegant. This type possesses a great capacity for perception and conception, and is generally firm, self-reliant, persevering, and sometimes domineering. This is frequently referred to as the American type. They do not like to be troubled with details, neither do they like to be kept waiting.

2. The Vital Type.—Persons with round faces, rather strong, but not so much as the motive type. They have a florid complexion, and a cheerful countenance, while the body shows an inclination to stoutness. This type is enthusiastic, impulsive and very cheerful, but frequently changeable and fickle, and can easily be led. They will change from one concern to another, for no other reason except love of change.

3. The Mental Type.—The nervous and brainy type. Head is large in comparison to body. Face is oval, with high, broad forehead, and the neck is slender. The eyes are bright and expressive. The features are fine and delicately chiselled, and the whole figure slender and graceful. They think deeply and quickly, have excellent tastes, and a love of the beautiful, also great imagination. They represent what is called the artistic type. The nervous system is highly developed, and the result a tendency to nervousness, irritability and fickleness. Here the receptionist must know her work thoroughly, and express its selling points forcibly, for this type asks questions, which if not answered intelligently, quickly loses an order.

A receptionist must act in a positive and definite manner to assure confidence. Confidence begets confidence, and if you would have others place confidence in what you say and do, you must show confidence in them. The average person likes to have his portraits made by his friends; in other words, he likes to patronise the people he likes personally. Therefore, if you would be a successful receptionist, you must cultivate the art of being friendly. Not the veneer variety, but the kind that springs from genuine love of humanity. Let it show itself quietly, not with gushing exuberance, but warmly and genuinely. The first impression the receptionist makes upon the patron is a lasting one, consequently it must be favourable and pleasing. We all know the healthy body attracts more favourable attention than the unhealthy one, and the receptionist who is cleanly, neatly and tastefully dressed, and carries herself well, conveys a more favourable impression than the careless, slovenly, slouchy one. In order to prepare yourself for a successful receptionist, you must cultivate the habit of decision and determination of will. Remember, he who hesitates is lost. You must not only be decisive and determined, but also persistent.

Second.—The receptionist must attract attention to photographs because a sale cannot be made unless attention is obtained. Efficient receptionists learn quickly what a patron requires, and then concentrates upon it. Frequently an order hinges upon the first few words of the receptionist in the introduction, consequently she must see the opening words, and assist in changing spontaneous to fixed attention. Fixed attention is that which will willingly follow the evidence and selling points the receptionist presents. If the introduction is properly made fixed attention results, otherwise the attention becomes indifferent. Indifferent attention is never willingly given, but is assumed, because for the moment there is nothing to do but listen to the receptionist. Many a receptionist fails because she does not know how to change spontaneous to fixed attention, and If this is not done the customer grows indifferent, and all chance of an order is lost. The receptionist, in order to change spontaneous attention to fixed attention, must be able to read the patron at approach and discover type and requirements. You must have a knowledge of photographs at your command, and learn to express it in a most effective manner. You will not need to tell it all to any one patron, but you must know just what will appeal to this particular type. Let me remind you that you will confuse your patron and either delay, or prevent his decision, if you show him too many photographs. Make up your mind what he ought to have, and then concentrate his attention upon it. Since people must be persuaded to buy the things which are of great advantage to them, think how much greater must be your power of persuasion to make them buy photographs.

Salesmanship is not a conquest, but a co-operation.

It is by skilfully making the connection in the mind of the patron, between your photographs and herself, that you change favourable attention to interest.

Interest must be aroused in photographs:—One cannot create interest in photographs unless one believes in them, and is honest in the presentation of their selling points. You must be convinced in your own mind that the photographs you are offering your patron will give satisfaction, or you cannot throw yourself into making the sale with enthusiasm, confidence, and persistence. One should watch the patron during presentation of selling points for signs of interest. Every person, either in facial expression or action, shows whether interest is aroused, and then if it is maintained. Interest is shown in various ways: Brightening eyes, the relaxation of anxiety lines or doubt on the face, the closer inspection or rejection of photograph, and the asking of questions.

Interest should be intensified and terminate in a desire to have photographs. We know desire is a feeling, and is more effectively intensified by suggestion than by reason. You can most powerfully arouse the feeling of your patron by painting a mental picture of the joy and pleasure a photograph will give to the dear one at home, or to a friend. By this time the receptionist should know if there is a possibility of changing interest to desire, and should make suggestions which appeal strongest to this type of patron. If you are to be a successful receptionist you will find it to your advantage to keep a record of selling points and their results on the different types and classes of people. If you take an order, determine what you said or did that persuaded that person to buy. If you fail, also attempt to determine why, and with the knowledge attained from these records you will greatly increase your efficiency. Thus is emphasised the necessity of knowledge of human nature in selecting selling points.

All the time spent upon the introduction, attention, interest and desire to have photographs is lost unless an order is obtained.

The conversion of desire to decision to have photographs tests the ability of the receptionist. Some have the power to arouse interest, and carry it to desire, but have not the ability to turn it to an order. A patron should be studied, and the price should not be kept in the foreground. Let it be the incidental, and not the principal element of an order. Customers are often talked beyond the purchasing point, because the receptionist does not recognise the psychological moment the patron has decided to have photographs.

There are three ways in which you can determine the psychological moment, and take advantage of it.

First.—By arranging your selling points as to give an opportunity for favourable action, at frequent intervals, but at same time not give opportunity for adverse action.

Second Method.—To take advantage of psychological moment, when desire ripens to decision, is to force the decision. You must not do this with the motive type, but can often do it with vital or mental types.

The third way is to learn to sense it. This only comes as result of careful study, and long practice. In other cases it is intuitive. Sometimes the customer unconsciously tells of his decision by a half-hearted objection: "Really, I ought not to spend so much for photographs." No matter how you learn the arrival of the psychological moment, the way to meet it is to stop talking and make it easy for patron to act.

Many fail because they lack the faculty of drawing the declaration that they will have photographs—from the patron. Every order is based on knowledge, therefore there is no excuse for failure.

Just as music washes away from the soul the dust of everyday life, just so the science of salesmanship will remove the cares from the reception-room.

MODERNISING THE ENLARGING LANTERN.

In a recent editorial in the "B.J." (Feb. 22) various practical and much needed reforms were suggested in the prevailing type of enlarging lantern, which was convincingly demonstrated to be far behind modern requirements, both from the standpoints of theory and convenience.

It may not, perhaps, be out of the way to hint that the desirable new type of enlarger would be much easier to design if the now old-fashioned, heavy, and clumsy condenser were jettisoned in favour of a silvered concave reflector, in conjunction with a diffusing medium. The accompanying illustration shows, broadly, how all the fundamental principles laid down in the before-mentioned article might then be closely adhered to and several additional advantages gained.

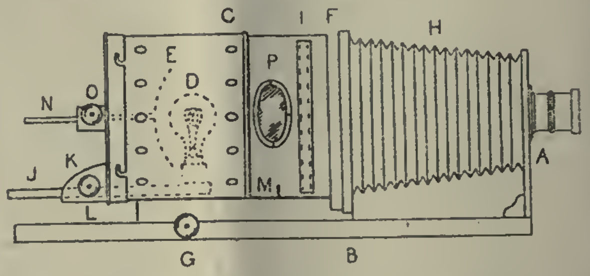
The main drawback of the existing enlarging lantern is the altogether irrational arrangement whereby the lens itself is moved to focus the image. In the new type the lens-board, A, would be a fixture at the front of the lantern base, B, while the "lamp-house," C, the electric bulb, D, mirror, E, and carrier stage, F, would all move simultaneously together along the base by means of a sufficiently fine rack and pinion, G. The carrier stage would, as usual, be connected with the lens-board by a bellows, H, which should be long enough to allow of reduction or full-size printing from wet negatives, etc, as well as enlarging.

About an inch behind the carrier should be placed a frame holding two pieces of ground glass, I, to diffuse the light, about ½ in. apart. A separate slot should be provided for these, so that they can be removed for cleaning, or only one piece used in certain cases. The lamp may be a small half-watt nitrogen-filled bulb, the holder being conveniently attached to a hollow triangular rod, J, passing through the back of the lamp-house and held by a bracket, K, thus providing a ready means of altering the distance of the lamp from the mirror, and also centering it automatically. The sliding rod may profitably be fitted with a rack and pinion adjustment, L, and obviously the electric wire may be carried through it. A stop, M, should be placed to prevent it being racked too close to the ground glass. The mirror may be a fixture at a suitable distance behind the lamp, but it is much better if it has a separate adjustment by means of a rod, N, moved by a rack and pinion, O. There should be a stop to prevent the mirror touching the lamp. In the apparatus illustrated this is unnecessary, since the lamp-holder itself will check the mirror before it gets too close to the bulb.

The special benefit of the reflector and diffusing medium as compared with the condenser is as follows: To use a large condenser advantageously with a small negative either the condenser would have to be moved further back from the negative and the light then separately readjusted, or else the negative-carrier must have an independent movement to rack out away from the condenser, which, again, unless one is limited to certain sizes of enlargement, would call both for readjustment of the light and refocussing. Each of these methods is troublesome, and imposes grave difficulties in the planning of a new apparatus. One can, of course, use a large condenser equally well with a small negative as with a large one, without altering the normal position of either condenser or carrier, only in that case a large proportion of the available light is unnecessarily wasted. The mirror, on the other hand, may be made to illuminate a larger area by bringing it nearer the lamp, while the intensity of the light may be increased by drawing the lamp to the ground glass. These two movements allow of a very nice adjustment both for area and intensity, while the diffusing medium renders the lighting entirely independent of the focussing. Such an arrangement also gives a more even illumination than is always possible with a condenser, while retouching or scratches on the negative are not so objectionably apparent.

The carrier stage should be fairly wide and provided with a spring pressure plate, somewhat like those on optical lanterns. This would allow the insertion of a thicker carrier containing mechanical movements, such as rising, falling, and tilting adjustments, if desired. Furthermore, the stage should be deep and open at the top, to allow of enlarging from portions of big negatives.

The *modus operandi* with the suggested new type of enlarging lantern would be much simpler than at present. The easel should be fixed permanently at one extremity of the bench, which might be graduated or marked to show the position of the lens for different sizes of enlargement and reduction. The entire lantern on its base B would be made either simply to slide, or to move by rack and pinion or chain and sprocket, along rails or guides on the bench. The first step would be to move the whole lantern till the lens-board coincides with the mark for the desired scale of enlargement, and there should be a clamping or locking device to prevent it afterwards shifting. All that now has to be done is to move the lamp-house and negative together towards and away from the lens, by the rack and pinion, G, provided for that purpose, until the projected image is perfectly sharp, when the best and most even illumination is lastly obtained by a slight movement of the rod, J, controlling the lamp, and, if necessary, an adjustment of the mirror by the rod N.



The lamp-house may be circular and preferably of metal, asbestos-lined and well furnished with trapped ventilation holes. The back should be removable by a bayonet-catch fitting for access to the mirror and lamp, while the latter might have a screw mount to give a slight rising and falling adjustment, since a new lamp would possibly be of a somewhat different height. As many other parts of the apparatus as practicable should also be metallic, including the rails or guides. A ruby inspection window, P, allows a view of the interior. Some might prefer to use a parabolic reflector or a corrected lens-mirror, but it scarcely seems worth while unless with a very small light-source.

A. Lockett.

COMMERCIAL PHOTOGRAPHY.

I have often been struck by some of the photographers in our large towns complaining about the lack of business, whilst in their very midst business of a profitable nature awaits any man, providing he will look for it. Many will say, "Yes, that's all right; but where has one to look for it?" Why, my brother professionals, there are incidents every day under your very nose, which, seized upon at the opportune moment, will lead to business, cash, and reputation; perhaps, fortune.

What photographer of standing has not, at some time or other, been called upon to photograph machinery, interiors of architectural constructions, old wills and documents, furniture, sites for factories, theatrical scenes, and a hundred and one different subjects of a like nature. And what has been the result, nine cases out of ten. Nothing but a lot of grumbles from the chief down to the assistant.

There are many photographers who call themselves photographic artists under the impression that their work lies solely in a studio, with an occasional outdoor group or two, following the same old routine day after day. Here is where they make a mistake. A man who calls himself a professional photographer should be open and ready, and, most important of all, capable of photographing anything that he may be called upon to do.

Capability of all things is most essential, because he will strike at some time or other what Mark Twain calls "the cussedness of things inanimate." If anyone doubts the reality of this expression let him try the experiment of photographing, say, a plain white and gold cup and saucer, or a bunch of flowers, or some tulips in bloom, so that the finished print shall show the texture, modelling, and "feeling" of the original, and I'll wager he'll not find it as easy as it looks.

Herewith, I propose giving a few tips on working, and, at the same time, suggest fields of labour of a profitable nature.

Firstly, it is most essential that the photographer should have a good all-round knowledge of his work, and especially of panchromatic plates. He must be wide awake and alert for every possible advantage, and make ready use of his wits. For they will be required as sure as there is a Friday in every week. The commercial photographer who simply follows instructions will meet with failure, and it is no good going to a job with sufficient plates for that job and no other. Always carry plenty of spare plates and a changing bag with you, then you will be all right, and whilst out on a job be on the alert for anything else that you might see. For example, you are asked to photograph an old country house; whilst doing this keep your eyes open for suitable subjects; it may be a pet dog or a favourite horse, perhaps a magnificent bed of flowers, or even a single bloom. If you cannot make use of the subject then, never mind, take it, for it may serve its purpose in some advertising subject later. The successful commercial photographer has an eye open for every opportunity and makes his opportunities as often as he sees them. It will surprise you in time what a peculiar delight you will take in finding the unexpected.

As in everything else, time is precious, and in this branch of work there is no time for mistakes and bungling, otherwise instead of getting a good reputation you will only create a bad one. For instance, suppose you were photographing a spinning loom and had the whole machinery stopped for ten minutes for an exposure which was a failure. Think of the hundreds who would have temporarily to stop work and lose time whilst you were making a second exposure. In many manufacturing concerns the extra waste of time would be immense, especially if the workers were paid piece rates, and you would bring wrath down on your head from many. Let me get down to my subject now.

There is railway work, for instance; here photography plays a most important part. Daily somewhere there is a junction, or signal box, new set of signallings, or bridge to be photographed, and somebody has to do the work. Why not you? Get in touch with the railway company whose line passes through your town. Tell them what you can and will do. Make yourself known to the head one in your district, and keep yourself constantly before him; it will surprise you the amount of work there is to be done.

Another point in connection with railways is to make a series of exposures of the scenery on the line and places through which the line passes, with a view to the company purchasing them for their advertising purposes. When you get instructions to take a certain set of views, take a few more on your own initiative from what you consider are better positions. Submit these at the same time along with the ones you have been instructed to take. To your surprise they will take them as well. This view-work consists of picturesque scenes and villages, sites for factories, engineering works, pleasure resorts, etc. It is most essential, of course, that the quality of work turned out is of the highest class obtainable. A survey of some of the handbooks issued by companies will give one some idea of the class of work wanted. The pay for this class of work varies, of course, with the amount of time occupied. An average basis to work on is usually so much per negative and one print (inclusive of exposures), with certain prices for duplicate copies. The average prices paid vary from 7s. 6d. to £1 1s. per 12 by 10 negative, the lower rate being when several negatives can be taken in a few minutes. Sometimes in working a certain district by duplicate prints there extra sales will result through local purchasers. One tip to bear in mind, always collect your money when taking an order from a local inhabitant, and have a receipt form printed on the back of your trade card.

Factories afford a splendid field for a smart man. There are many views that can be taken with monetary value. A few views of the exteriors, including the wharves and sidings, and a good general panoramic view of the whole of the buildings sometimes result in a good fat order. When you receive an order, spend a day with one of the heads going over the ground to be done, carefully making notes as to time, lighting, and position, especially when engaged on interiors. In this branch of work one cannot always choose the most artistic standpoint, therefore art must be sacrificed and the best commercial position chosen. The same thing applies to panoramic work; get as high as you can, using a wide angle lens if necessary, and choose a position which gives a good view of the wharves and sidings in full swing. Use a fast plate and good shutter, and so get a view with everyone hard at it, and unaware of what you are doing. Above all things, do not permit yourself to be hurried, work as quickly as you can, but only as quickly as will ensure your getting good negatives. Many a photographer has met with failure and disappointment through trying to get over too much ground in one day. Having once decided on a plan of working, stick to it, and do not deviate from it without special and urgent reason.

Whilst on the subject of factories, a few notes on interiors and machine photography will not be out of place. Some years ago I picked up an old copy of "Cassier's Magazine" in which there was a good article on machine-shop work. I will here quote a few extracts:—

"The photography of machines comprises, to begin with, various products of the establishment for advertising purposes. These photographs should be made from a standpoint that will readily show the machine as a whole. This does not always give the intending purchaser the full information required about certain of its working parts which are somewhat obscured in the general view, therefore a series of individual views should be taken so that all internal working can be seen. It is necessary, to make a successful job, that the photographer should anticipate what is wanted, and photograph the machine from different points of view. In addition to showing the internal working, such points as gearing and milling heads and belt shifting devices all make desirable photographs of a selling value.

"Take, for example, a lathe: photographs should be taken showing the arrangement of chuck and cone-heads in such a way as to explain its construction and detail, or any other device which the makers may claim to be superior to that of a competitor's make; or again, certain points with which they desire to impress a prospective purchaser.

"Photography in a workshop can be of great use in the duplication and making of standard sets of drawings. Prints 10 by 8 and 12 by 10 in either white on black or blue print, bound book fashion, are most useful for travelling salesmen engaged in the selling of engineering tools and appliances.

"Again, in the pattern-room and foundry, a record can be taken and kept of any particular pattern or casting by the means of photography. Especially where patterns are sent a distance, accompanying photographs will make the subject much clearer to the one who has charge of piecing them together. Patterns can be photographed on a small plate with a good anastigmat lens, and afterwards enlarged to any required size.

"Great care should be taken when photographing machinery to light it properly, owing to heavy shadows and bright polished high lights."

Whenever possible the machine should be placed in a north light, but preferably not where the strongest light comes from the top. It will be necessary to screen the upper part owing to this being of highly-polished material, whilst the base is heavy black. Here use a reflector to throw light into its darkest shadows. One satisfactory method is to burn short lengths of magnesium ribbon behind the camera, keeping them near the floor; at the same time with a to and fro swinging motion so as to break up the shadows. Again, bright polished work can be dulled down a good bit by dabbing it over with a ball of putty. This deadens the polish to a marked degree, therefore care should be taken from getting too dull an effect.

Good serviceable reflectors can be made on folding frames from white cloth or paper. These can be pleaced at various angles for throwing light into the darkest corners. In front of the machine lay some strips of white paper (this paper can be obtained in rolls), or what answers very well, the reversed side of wall-paper. Behind the machine hang a white background. The kind I prefer is a white lantern sheet (for small machines), about 15 feet square on a telescopic stand. To the bottom of the supporting struts affix some castors, so as to permit the moving of background to and fro during exposure. This procedure will be found to break up any heavy shadows that may be thrown on it. Should the machine have the maker's name, or stock number cast on it, rub the letters over with a piece of chalk, then they will stand out quite prominently. Use a plate of average speed, expose well, and develop up strong, preferably with metol-hydroquinone or pyro-soda. This should give one a good, bright, clear negative, full of detail and contrast.

Sometimes photographers are called upon to photograph bottles and small glass articles. These are generally required with a perfectly white background. Blocking out is a method very useful, but sometimes difficult, especially with a subject of intricate design.

One of the finest methods I have ever struck is to use a sheet of ground glass for the background. This is used up against one of the studio windows, blocking out all light except a little directly above. This top light should not be allowed to fall directly upon the subject, but softened down by the interception of a diffuser of tracing cloth or butter muslin. It is necessary to take this precaution, especially on subjects of a rounded nature, which would reflect a harsh high light unless this latter be broken. The best results in this branch are to be secured by the use of a panchromatic plate and filter of about 4 to 6 times, or a good self screen-plate will be often found useful.

When making photographs of chinaware, bric-a-brac, and other small articles, it is most essential that the full designs and patterns are preserved. The best thing to do is to have an arrangement containing shelves of a removable nature. These shelves should be covered in black velvet, with a background and drop front of the same material. On this base articles can be arranged speedily and tastefully and shown up to their full advantage. Take great care in lighting this class of subject. It is preferable if the light is softened by use of a tracing cloth or muslin diffuser, the aforementioned is better. This screen will effectively remove all shadows and harsh lights.

When photographing highly-glazed chinaware, especially of a rounded nature, a panchromatic plate and filter will be advantageous. Here it is most important that the light be well diffused, otherwise patchy high-lights will result, with a disastrous effect. If the subject is a cup and saucer, or anything of this nature, a little streak of high-light on extreme edge or handle adds greatly to the effect. The maxim to bear in mind is, if you don't know how to arrange to best advantage, consult a good trade catalogue.

Silverware and cut glass is tricky, and a fine result is often marred through lack of attention to what may appear minor details. Use a top light for cut glass; this will give brilliance and life to the whole subject. The best colour to use for the background is either deep brown, black velvet, or grey. A pale grey with correctly exposed negatives renders a fine and delicate effect, especially if the finished print is vignetted and air-brushed. If silverware can be photographed unpolished, do so; it is ever so much easier to do then than after polishing. Should this procedure be impossible, bright spots and high lights can be dulled down by rubbing the spot with a little beeswax and then gently smoothing it over with the palm of the hand. Sometimes the silverware is engraved and inscribed; much to one's disgust the inscription does not always show. Result, another exposure. Therefore, before exposing, rub into the engraving a black powder which jewellers use in their work. This will be found to stick sufficiently well without requiring any mixture with it.

Use a medium plate, like Paget XX or Imperial Sovereign, and develop up clean. A touch of opaque here and there on back of negative will give all that can be desired.

Furniture is somewhat difficult, as one is called on to photograph it under varying conditions. If it can be done at the factory, so much the better; but, above all things, avoid having too much light. The best plan I find is to use a light from window directly at one's back, blocking out some of the side light with tissue paper, nainsook, linen, or tracing cloth. It is not advisable to block the light out completely, but tone it down and soften it. If the walls and ceiling are white no reflectors will be required. Best results are obtained with lens of about 15 or 16 inches focus for 12 x 10, other sizes in proportion. Panchromatic plates and filters are best. On old Japanese lacquer work a red contrast filter used for a short while during exposure in place of a K2 or K3 will give wonderful results. Some subjects I have found show much beautiful grain and inlaid work when a contrast filter is used.

Always use the camera a little higher than the highest point of article being photographed, except, of course, high pieces, such as cabinets or wardrobes and such articles. By using the camera a little higher it will show the back edges of seats, etc., to their full advantage.

Sometimes one is blessed with a good plain wall which can be used as a background, and sometimes one has to be content with anything, perhaps a whole assortment of odds and ends stacked behind the article photographed. Should this be the case, blocking out is necessary. Many photographers object to the blocking out in any form, saying it is difficult. Not at all, if one takes certain precautions before proceeding. Firstly, use a good opaque—Photopake is good; should it be thick, thin down with a little water, just enough to make it pull slightly. Sometimes sharp angles and curves have to be carefully followed round, and when using a fine pointed brush it has a habit of broadening out, with the result, something spoilt in outline. A dodge I once discovered was to use a very fine steel pointed pen charged with opaque from a brush. With a pen so prepared one can carefully follow the most intricate pattern or outline without deviating from the original outlines.

Where one has a series of straight lines and angles to block out round, the following will be found of use. Lay the negative down on a sheet of white paper, film side up, then with a ruler and finely pointed retouching pencil follow the outline carefully. This will then form a kind of safe edge all round the object, which prevents to a certain extent the opaque from overrunning and thus producing a wavy line. Finish the negative off with a mask over all, and you will get repeated copies all alike. For reproduction work a glossy paper is necessary, but for framed or mounted prints a smooth matt surface is preferable, as this surface will easily take plenty of working up if required.

In the above I have only touched on some of the branches of commercial work, which is a field containing, one might safely say, hundreds of different subjects. When you come to consider that nearly every trade catalogue issued at the present time contains a large number of illustrations, at least two-thirds of which are reproduced from photographs, this alone should give food for thought.

Take the drapery trade alone. A smart photographer, with a good lady operator, can keep himself pretty busy photographing figures, and gowns, and clothing in galore. Think also of the fine opportunity you have of getting up-to-date specimen photographs of ladies in the latest style of gowns. One man I know who does this has a display in his window every Monday of a few specimens of the latest fashions. The ladies of the district simply swarm round it, anxious to catch a glimpse of the coming styles. A few copies presented gratis, sometimes to costumiers or milliners, with a suggestion that they are placed in their windows, helps to couple up your business and brings your name prominently before the spending portion of the population of your district. For, after all, where would photographers be if it were not for some of the ladies? **Benjamin F. Welch.**

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Entries close September 3. Hon. Secretary, 5a, Pall Mall East, S.W.

October 14 to November 30.—Royal Photographic Society. Entries close (carrier) September 20; (hand) September 21. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

His Majesty the King has been graciously pleased to accept copies of the War Ribbons Postcards in colour photography devised and arranged by Commander E. Kinder, R.N.

Defence of the Realm.—At Long Eaton last week, a Clifton clergyman was summoned for carrying a camera at Portishead on July 12 without a permit, and a railway clerk living at Maidenhead, and who was on a holiday in Bristol, was summoned for a similar offence at Portishead on July 24.—Supt. Palmer said that the regulations were made under the Defence of the Realm Act, and produced a copy of the Order defining the area.—The Chairman: Are these regulations posted up anywhere so that people can see them?—Superintendent: No.—The Chairman: Why not?—Superintendent: One reason is the shortage of paper, but the regulations have been in force three years, and are common knowledge now.—Mr. G. H. Wollaston (one of the Bench) thought the notice ought to be posted up at the railway stations notifying the people they were in a prohibited area, and warning them with regard to the carrying of cameras.—The defendants in both instances admitted the offence, and said that they had no intention to commit a breach of the regulations.—The Chairman said they believed the defendants had acted perfectly innocently in the matter. The Bench were bound to convict, but they recognised that the regulations were not well known, and hoped that prominence would be given to the matter in the Press. A fine of 7s. 6d., to include costs, was imposed in each case.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Relief Prints.—No. 117,135 (July 6. 1917). The invention relates to relief photographic prints in which the print is modelled from the front upon a backing of plastic material.

A photographic print is cut to the outline of the figure or image on the photograph and is closely secured upon the face of a cast which has been produced from the hand-made model; the edges of the print and cast, being finished off or covered in any suitable manner.

Referring to figs. 1 and 2, a backing board *a* has a flat back of the cast *b* secured thereon, whilst the photographic print *c* is cut to the outline of the figure and secured on the face of the cast in such manner that the picture shows in relief the figure or image printed on the photographic print; the raised parts and hollows in the cast corresponding with the light and shade on the print.

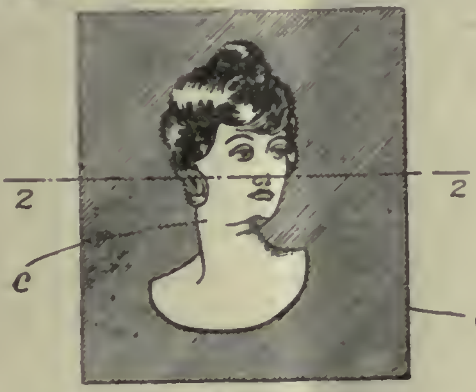


Fig. 1.

For the preparation of the cast, a quantity of plastic modelling clay *d* (see fig. 3) is placed on a modelling board *e*, and over this clay *d* is placed a sheet of thin paper *f* with the image or figure printed photographically thereon.

Fig. 2.

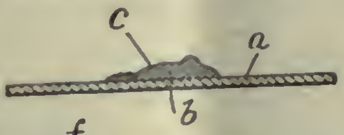


Fig. 3.

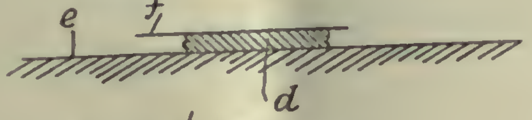


Fig. 4.

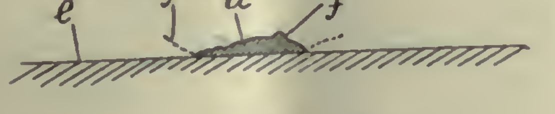
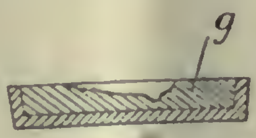


Fig. 5.



The modeller then prepares the clay model in the known manner, and presses the surface of the paper *f* so as to give the desired form to the clay *d*. The surplus clay and the marginal edges *f'* (see fig. 4) of the paper *f* are then removed. The paper *f* on the face of the model is then torn off, and by means of this completed model a permanent mould *g* (fig. 5) is prepared, and from this mould *g* any desired number of similar casts may be produced. The mould *g* is preferably made from plaster of paris mixed with any fine cement. In forming the permanent mould *g* from the model *d* and in forming the casts *b* from the permanent mould *g* the surfaces are preferably varnished or greased to prevent sticking.

The final print—which is preferably on thin paper—is cut to the outline of the figure and is secured on the face of the cast by means of any suitable adhesive, and is made to adhere closely to all the hollows and projecting parts of the cast. The edges of the figure are then finished off or covered in any suitable manner.

Instead of mounting on a board or backing such as *t* the cast may be unmounted or may have a backing cut flush with the edge of the figure on the print, the whole being preferably provided with a supporting base or other supporting device.—Reference has been directed, in pursuance of Section 7, Sub-section 4, of the Patents and Designs Act, 1907, to Specification No. 27,076 of 1909. Albert Drummond Shiels, Thornhill House, Wishaw, Scotland.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Pompey. No. 384.061. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. The Portsmouth Photo Co., Limited, 8, Arundel Street, Portsmouth; photographers and photographic dealers. June 22. 1918.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

Alpha.—No. 382,224. Registered by Ilford, Ltd., in Class 1.

Metzol.—No. 382,950. Photographic chemicals. Metzo, Limited. Scots Bridge Mill, Rickmansworth, Herts; manufacturers of and dealers in photographic paper and chemicals.

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Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SATURDAY, AUGUST 31.

Manchester Amateur Photographic Society. Outing to Plumbley for Hulme Hall and Lower Peover.

TUESDAY, SEPTEMBER 3.

Hackney Photographic Society. Chat about Transferrotype. W. L. F. Wastell.

Manchester Amateur Photographic Society. "Preparing the Exhibition Print." H. B. Bradley.

WEDNESDAY, SEPTEMBER 4.

North Middlesex Photographic Society. Art Critics Criticised. H. Stuart.

CROYDON CAMERA CLUB.

During the informal session the club has, so to speak, lived from hand to mouth, but as yet has never gone empty away. It fed last week off more pinholes, for Mr. B. T. Rose since his last demonstration has been further experimenting with a modification in their manufacture, and with considerable success. Indeed, the stereo-pictures shown by him on cursory examination might well have been the work of a lens, although printed on glossy P.O.P., which would accentuate poor definition.

Many, naturally, regard pinholes employed as lenses merely as curiosities interesting enough in their way, but having no practical use. Yet there may be special cases when the absolute rectilinearity of the image might be of value, and the extreme wide-angles possible might be pressed into service as an improvisation, when an extreme angle is wanted and only normal foci lenses are at hand. Again, it has been laid down that pinholes will deal satisfactorily with subjects of violent contrasts, and halation is reduced to a minimum. This is supported by the claim often made in the past by the *f*/64 man, that the use of his favourite stop materially lessened halation; and assuming this to be the case, the obvious explanation appears to be that the feeble light after traversing the film is so weakened in intensity as to be incapable of appreciable further action on the return journey.

It is unfortunate that the dear old *f*/64 gentry have either departed to larger diameter circles or retired into oblivion, for they materially brightened the photographic world by the forcible opinions they expressed about the out-of-focus school. Unluckily for the attackers, those attacked occupied an unassailable position, realising as they did that all great innovations in art are invariably misunderstood by those less richly endowed in true perception. Even now, any adverse criticism based on the fact that the misunderstanding continues unabated to this day can logically be countered by the statement that the longer any misunderstanding remains the greater the art must necessarily be. This sane argument is not borrowed from Ezra Pound, as might be thought, nevertheless as regards modern "art'isms" it must be considered as a fundamental condition of existence.

To revert to a subject of another magnitude, after various experiments Mr. Rose finds the following procedure gives the best results. A piece of thin tin-plate is taken, such as that afforded by the inner soldered-on cover of a Gold Flake cigarette tin, and is laid down on a sheet of lead. On top is placed a ⅛th steel ball (as used for ball-bearings) in position where the pinhole is required, and is made to remain there by damping it with water or paste. A smart but light blow with a hammer is then struck, resulting in a spherical dent in the metal, which if not sufficiently pronounced can be extended by replacing the ball and again tapping with the hammer. The convex side of the circular protuberance is next carefully rubbed down on an oil-stone until it is fairly thin. If this operation be pushed to extremes, when the needle is inserted a ragged hole will result. A very little practice will indicate the happy mean. The piece of tin is now placed on a few sheets of paper with the convex side of the depression downwards, and the point of the selected needle, held vertically, is carefully pushed through the centre for a short distance only. The burr produced on the convex side is removed with the stone, this procedure being repeated until the needle can traverse the hole almost up to the eye. The hole is blackened with lamp-black finely ground in gum-water, which Mr. Rose said seemed to answer all purposes. As giving an idea of the exposures required the following data may be of service. Pinhole 1-50th inch diam. 5 inches from Imperial N.F. plate: August. Subject:—Heavy foreground; light good, 2.30 p.m.; exposure 40 seconds. Subject:—Light interior (ordinary room); good north light, 4 p.m.; exposure 70 minutes. Pinhole 1-70th inch diam. 4½ inches from N.F. plate: garden scene; bright sunlight, 3.30 p.m.; exposure 40 seconds. This last showed the finest definition.

The proceedings terminated with a hearty vote of thanks to Mr. Rose, who is to be congratulated on the excellent results obtained, and a discussion in sympathy with a balmy evening. The significance of the terms "experts *in* pinholes," "experts *on* pinholes," and "pinhole experts" was debated without agreement. Optical questions also received attention, the meeting breaking up on the president announcing that *hypo*-focal distances had extended to 1s. a lb.

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What to do with Old Tins.—Manufacturers and packers who have accumulations of old tins will find it worth their while to communicate with the Director-General of National Salvage, Caxton House, Tothill Street, before attempting to dispose of them. Tin box manufacturers throughout the country are also invited to put themselves in touch with the Director-General of National Salvage, who will be pleased to give advice and, when possible, to bring buyers and sellers into touch with one another. Owing to the scarcity of new tin plate, the utilisation of old tins by cutting them up and rendering the plate into smaller tins is becoming an important industry, which will help the many trades to which tin boxes are essential, and also relieve those to whom the disposal of old tins was a constant worry. Old tins should be treated with greater respect than hitherto and care should be taken to prevent their becoming unnecessarily damaged or rusted by exposure. The collection of "household tin" is still a considerable problem, especially in rural districts, but accumulations of tins at factories can be readily dealt with.

Commercial & Legal Intelligence.

NEW COMPANY.

Art Collectors' Association, Ltd.—This private company was registered on August 22, with a capital of £2,000 in £1 shares. Objects: Exhibition holders, dealers in pictures, photographs, picture frames, art publishers, photographic printers, etc. The subscribers (each with one share) are:—E. M. Andrews, 6, Broad Street Place, E.C., secretary; W. J. Thomson, Woodhays, Muswell Hill Road, N. (10), company director. The first directors are to be appointed by the subscribers. Solicitors: Ashurst, Morris, Crisp and Co., 17, Throgmorton Avenue, E.C.

News and Notes.

Scientific Products Exhibition.—In consequence of the interest shown in the British Scientific Products Exhibition, at King's College, Strand, it has been decided to extend the hours of opening on Saturdays from 11 to 7, as on other days.

A Different Name.—At Warwick last week, Norman Edward Schwanke (16), photographer's assistant, son of a naturalised German, of Beausale, was fined £5 for making false statements in filling up an identity book.

Deputy Chief-Constable Ravenhall said defendant signed a Frenchman's identity book in a place provided for the signature of the householder, and that he spelt his name "Swanke."

The Clerk pointed out that surnames beginning "Sch" were so characteristically German that the alteration of the name was a serious thing.

The defendant said he was told that there was no liability in connection with the signature of the book. He was very busy at the time, and it did not strike him as being an offence to spell his name in the way he did.

Sensitiveness of the Eye.—In a paper on the limit of sensibility of the eye and the minimum of power visually perceptible, which appears in the March-April issue of the "Journal de Physique," M. Buisson claims that the eye is much more sensitive than it has been thought to be. A number of discs of diameters from 2.5 to 5 millimetres were covered with phosphorescent material, and the light sent out by them determined by the Fabry-Buisson micro-photometer to be between two and four candles per square centimetre. Two of these discs of the same size and strength were mounted on a screen, which was gradually removed from the observer and at the same time rotated about his line of sight, and he was required to state the direction the line joining the two discs made with the horizontal until with increase of distance it became impossible. For discs of different diameters and strengths the limit of perception was found in all cases such that if there were no absorption of light by the atmosphere a candle would be visible at a distance of 27 kilometres. This is equivalent to a star of the eighth magnitude, and it is probably the light of the sky which prevents stars of higher magnitude than the sixth being visible.—"Nature."

Beach Photography at Blackpool.—Ed. Wm. Roach, a photographer, was before the Blackpool Bench last week summoned for taking photographs on the sands without permission.

The Acting Chief Constable (Mr. Derham) said there had been a great number of these photographers on the sands, and this defendant was one of a gang who came from London each summer. It was not right they should ply their calling on the sands when others paid £60 or £80 for stands. By taking photographs of groups of bathers they reaped a good harvest.

The Clerk said it was not fair to the shopkeepers, and made it objectionable to the bathers.

Defendant was fined 40s.

A local photographer, named Arnold Wexler, was summoned before the Blackpool magistrates for taking photographs on the sands.

Defendant stated that this was his first season, and he was in Blackpool on medical advice, as this was the only occupation he was strong enough to engage in. He was a considerable distance from the foreshore.

The Acting Chief Constable (Mr. Derham) said defendant did not take any other photographs—only ladies—he had a fascination for them. A fine of 40s. was imposed.

Australian War Photographs.—A collection of pictures and photographs illustrating war incidents in which the Australian troops have taken part is on view in the Exhibition Hall at Australia House. In addition to gigantic photographic enlargements of battle scenes, paintings and drawings by the official artists with the Australian Imperial Forces (Lieutenants Leist, H. S. Power, W. Dyson, J. Quinn, and Charles Bryant) are exhibited.

In a few days a number of war trophies captured by Australian troops will also be placed in the hall. No charge is made for admission.

Tribunal Appeals.—A photographer was applying for exemption at the City Tribunal last week, and spotting a likely candidate for the photographic arm of the Air Service, the National Service Representative suggested that he would be a very useful recruit, and didn't he think he would? Applicant was ready with his reply, which was to the effect that the Army took one of his skilled operators recently ostensibly for the job, for which he had every qualification, but since he had been in the Army the man had only done clerical work. As the National Service Representative admitted, this answer took the wind out of his sails, and the applicant was granted two months.

At Haslingden, a photographer, 48, married, Grade 2, asked for time to put his affairs in order, saying he was willing to go into the Royal Air Force, and was applying for enrolment under the Professional Photographers' Association. Both his sons were in the Army, one with three years' service, though not yet twenty. End of January temporary, and exemption from the V.T.C. on condition that he takes an allotment.

Before the Kensington Tribunal, John B. W. Holloway, a photographer, of Maxilla Gardens, 46 years of age, Grade 1, said he was working for himself, and suffered from chronic indigestion. He had appealed for another medical examination, but this had been refused, he said.

The N.S.R.: He is only a photographer, and that is not work of sufficient importance to keep a man out of the Army. He has had his chance before the Appeal Tribunal. Application refused, not to be required to join up before September 14.

At Lincoln William Geoffrey Wolstenholme, of Rosebery Avenue, was summoned before the Mayor (Mr. C. T. Parker) and Mr. William Rainforth, at the Lincoln City Police Court.

Major Charles William de Roemer, sketching the case, said that on Saturday, July 13 a number of boys were at an aerodrome. One of them had a camera. They were chased, and the boy with the camera, who escaped, turned out to be Wolstenholme. Their worships must not think the Royal Air Force was losing a sense of proportion in directing action against so youthful an offender, but the prosecution was taken advisedly. For the purposes of espionage, children and other perfectly innocent agents might be used, and if an offender was let off because of his youth, it would be opening the door very widely.

Mr. Wolstenholme, for his boy, pleaded "guilty" to the technical offence. He said the boy was only 13, and delicate, and he had thought it better not to bring him to a police-court.

Witness was of British nationality, and his forefathers had been British for many generations. The boy had no sinister object in taking any pictures.

Mr. Wolstenholme said they bought the camera for the boy last October, and apart from the present incident he did not know that the boy had misused it in any way.

The Clerk reported that by the Act defendant was liable to a fine of £100, or six months' imprisonment, or both.

After consultation with his colleagues, the Mayor said that they quite realised the importance of the case, and they had decided to convict. The orders must be enforced; it was very possible for boys with cameras to use them for illicit purposes. Having regard to this boy's tender years, and the prosecuting officer not asking for a heavy penalty, they imposed a fine of 10s. only, but they wanted to say that had it been an older person, or even if this young boy came before them for the same offence again, the penalty would be very much greater.

Major de Roemer: Will you make any order as to the camera?

Mr. Wolstenholme: May I suggest that it be sold for the benefit of the Red Cross? My boy does not want it.

The suggestion was accepted by the Bench.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

⁂ *We do not undertake responsibility for the opinions expressed by our correspondents.*

PAPER NEGATIVES.

To the Editors.

Gentlemen,—I have seen Calotype negatives as transparent in the shadows as the finest oiled ground glass. And I had a sheet or two of Pirie's paper made in 1860 quite clear and good—the water marks at that time were made by an Englishman and his son, in a workshop apart from the paper works in Aberdeen. From the enclosed sample you will see that they can make paper fit for anything, so that there is a great future for British paper makers if they are careful and put the right paper on the market.—I am, gentlemen, yours faithfully,

Banff, N.B. H. Holman.

THE GLASS SHORTAGE.

To the Editors.

Gentlemen,—With the present scarcity of glass would it not be possible and practical to introduce a stripping plate again such as was made at one time for collotype? My idea is that the makers should first coat the glass with gelatine and then coat with emulsion so that the result would be a stouter film. After exposing, developing and fixing, the negative could be retouched, varnished with flexible varnish such as celluloid in amyl acetate, stripped from the glass, and the glass returned to the plate-makers. I offer the proposition for what it is worth.—Yours faithfully,

August 26. F. C. S.

THE ADVANCE IN THE PRICE OF PLATES.

To the Editors.

Gentlemen,—I was glad to notice the remarks of "Country Photographer" in the "B.J." of the 23rd. Are the plate makers allowing us a reasonable price for old negatives? The present market price of glass is 8d. per square foot. There are exactly 10 square feet of glass in a dozen 12 x 10 plates. Value of glass, 6s. 8d., for which the plate makers are allowing 2s. 11d. Comment is needless.—Yours, etc.,

August 24. A Victim.

To the Editors.

Gentlemen,—As a large user of plates in Lancashire I have followed the correspondence in the last two issues of the Journal—re the increased prices now charged by the Plate Makers' Association, and it is gratifying to know that professional photographers are at last taking an interest in the commercial side of their business.

I am aware of the difficulties in securing materials for the manufacturers, but the general opinion in Lancashire is that this particular form of a double penalty is not justified.

There is only one remedy, i.e., all master photographers throughout the country should form County Associations. "Unity is Strength," and now is the time for organisation. That feeling of reserve or jealousy, which has hitherto existed, should be swept away.

There will be a meeting of master photographers on Tuesday next, September 3, at George Hotel, Market Place, Preston, 5.45 p.m.; a cordial invitation is extended to every master photographer in the County of Lancashire and surrounding districts.—Your faithfully,

14, Balfour Road, Southport. F. Read.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

J. LINKLATER.—Gravura paper of the Paget Prize Plate Co., Watford, Herts., answers to your description.

C. A. P.—Our interpretation of the Retail Business Order is that in your case it will not be necessary to obtain a licence. And if you run the business under any other name than your own, you will have to register it.

T. F.—There is always a tendency for a fixing bath to give a certain amount of deposit after use. You can filter it out, or swab the surface of your negative or prints while washing; the latter is the usual course.

N. A.—We do not think that you can legally claim any wages for the two days. You went in without being instructed to do so and at your own risk. It would of course be a graceful act on the part of your employer to pay you for the time worked.

END.—We regret that we cannot place a price upon the lamp you mention, as we have no list by us. As a general rule, such goods are worth about half list price. If you wish to sell, this is a favourable time as many camp photographers have to use gas.

W. G.—It is rather difficult to say what the stains are caused by, but we are inclined to think they are due to uneven sulphiding. We have seen similar patches when prints stuck together in the sulphide solution, especially when not drained before being put in.

UNDEVELOPED PLATE.—Can an *unexposed* plate be recovered if inadvertently placed in developer?—ECONOMY.

If the developer is washed out, the plate can be used for an exposure, but it will probably be slower—how much it is not possible to say.

G. R.—About the best book is the "Art of Retouching," by Johnson, which our publishers can supply, price 3s. 4d. post free. For personal tuition we would suggest the Regent Street Polytechnic. Should you desire postal lessons a very good teacher of long experience is Mr. T. S. Bruce, 4, Villas-on-Heath, Vale, Hampstead, N.W.

E. C.—You will find very clear instructions with diagrams for making gelatine emulsions and coating plates in Abney's "Instruction in Photography," published by Iliffe and Sons. We would warn you, however, that the manufacture of plates for portrait work is by no means easy, and if you require any quantity a special room for coating and drying would be necessary.

RETAIL BUSINESS ORDER.—I shall be glad if you can tell me when the Order of the Ministry of National Service *re* retail businesses came into force. You mention it in your reply to "T. L." in "Answers in Correspondents" in "B.J." for August 9, 1918.—M. G.

The Retail Business (Licensing) Order came into force on February 18, 1918. Copies of the Order are obtainable through any bookseller or direct from H.M. Stationery Office, Imperial House, Kingsway, W.C.2, price one penny.

W. H.—You can procure materials and full directions for use as well as cost of celluloid and apparatus from Messrs. J. Fallowfield, 146, Charing Cross Road, London, W.C. Messrs. H. Rheinlander and Son, New Malden, Surrey, also supply celluloid and cement for this purpose. Materials for button photographs, ferrotype process, are at present unobtainable unless Messrs. Fallowfield can supply you. The import of these materials from America is now prohibited. The latter firm imported largely at one time, and may have these ferrotype plates in stock.

W. T. T.—The ordinary metal filament electric bulb is about the worst light for an enlarging lantern owing to the size and form of the light. There are special focus patterns of electric bulb sold for enlarging, but they have been unobtainable for a long time past owing to the demands upon the makers for the ordinary pattern. Therefore, in present circumstances, you cannot do better than choose one of the little Westminster arcs, which, in any case, are as good as anything which can be got for enlarging, although, of course, not quite so automatic in use as a focus type bulb. But we are quite sure you will not be disappointed in the use of this light. The address of the American Lead Pencil Company is 173-175, Lower Clapton Road, E.5.

SOFT-FOCUS LENS.—In "Answers to Correspondents," in the number of July 19, 1918, page 332, "Soft-focus Lens," you mention a Dallmeyer patent portrait lens 3A, but in their catalogue of lenses, last page, number 16, under the title "The Dallmeyer-Bergheim Portrait Lens," I can only see three numbers: 1, 2, and 3. Is the 3A a new lens not included in their catalogue? Will you also be kind enough to let me know which is the best way, if any, for the blocking out of a film?—COUNT DE PENHA LONGA.

1. The 3A is one of the earliest of the Dallmeyer lenses, dating back to 1866. It has an aperture of $f/4$ and a focal length of 16 ins. You will find it in any dealer's list. Messrs. Dallmeyer would send you a catalogue. The 3A is still a prime favourite. 2. To block out a film, outline with soft lead pencil and work round this with red water-colour, Venetian red, or Photopake.

LAMP FOR RETOUCHING.—We do a lot of retouching and finishing in the autumn by gaslight, using gas table lamps for the purpose. As we are, however, going to be allowed so little gas, we shall be unable to get sufficient. Can you suggest any special lamp (oil) suitable for retouching? Some time ago someone wrote an article in the "Journal," and mentioned a lamp which gave an excellent light for retouching, I cannot remember what it was, but it was not gas. If you can help me in the matter I should be much obliged.—GAS.

Any good duplex lamp will answer your purpose. In order to modify the yellowness of the light you should interpose a pale blue stained film between the light and negative, say a couple of inches from the lamp chimney. You can make this by fixing out an unexposed plate, washing it well and immersing in a little blue dye. Ordinary blue ink (not blue black) will do, but it must be well diluted with water.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as the acceptance of "returns" by a publisher is now prohibited by the Government. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

THE BRITISH

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SUMMARY.

The unmounting and re-mounting of photographic prints, incident to the making up of albums or uniform sets, has occasionally to be undertaken. Instructions for doing this rather troublesome class of work with the minimum of risk will be found on page 402.

About the only paper which the photographer in search of distinctive effects can be recommended to make for himself is that known as "plain salted." We quote, from "American Photography," formulæ and working instructions for its preparation. (P. 403.)

An illustrated description of a very useful vertical camera stand for engineering work will be found on page 406.

Detailed instructions for converting any printing-box into a strip printer by means of a home-made cardboard adapter find a place in "Assistants' Notes," on page 404.

A correspondent calls for more energetic action in the interests of the profession on the part of the P.P.A. (P. 407.)

Queries relating to the opening of new premises, engineering work, and the choice of a lens are dealt with among others in "Answers to Correspondents." (P. 408.)

Under the heading of "Patent News" will be found particulars of a compact folding camera. (P. 405.)

An explanation of the remarkable sharpness of cinematograph pictures when projected in the ordinary way, as compared with the poor definition obtained when it is attempted to make bromide enlargements from single pictures, is given on page 401.

Some suggestions to amateur plate-makers, with a view to economy in their early experiments, are made on page 402.

The desirability of testing a lens on the actual work it is desired to do instead of merely treating it as an optical instrument forms the subject of a paragraph on page 402.

"Colour Photography" Supplement.

Various methods of making screen-plates for direct colour work are dealt with in "Decennia Practica" on page 35.

The first portion of a paper dealing with an interesting question of colour perception, with suggestions for a method of colour analysis by novel means, is given on page 33.

A hint for those who experience discomfort in the use of dark-room illumination such as is suitable for a panchromatic plate will be found on page 36.

A recent paragraph in "Nature" outlines particulars of a system of colour photography said to have been devised by the Munich experimenter Dr. A. Traube. (P. 36.)

EX CATHEDRA.

Grain in Enlargements. We have often advocated the taking of a number of small negatives of a child or troublesome sitter with a view to selecting the best and enlarging them to the desired size. Working on these lines, Mr. J. W. Anderson, of San Francisco, has produced a camera in which a large number of exposures can be made, cinematograph fashion, upon a 7 x 5 plate, the number of exposures possible being from two up to a thousand. It is stated that the little negatives will stand a high degree of enlargement, but this presumes not only absolute sharpness of the image but a much finer grain than can usually be obtained with an emulsion of anything like useful rapidity. We are afraid that those who suggest making 15 x 12 enlargements from single cinema exposures are deceived by the appearance of the picture upon the screen. The perfect sharpness so often seen with good films is not only due to good manipulation but to the fact that the imperfections and grain of each exposure do not remain long enough on the screen to impress themselves upon the retina. The grain is constantly shifting its position with regard to the details of the picture, and an impression of perfect sharpness results. This was brought home to us lately by the experience of a photographer who, after seeing a film projected, undertook to make a number of 20 x 16 enlargements of various episodes. To his intense surprise the film, which appeared perfectly sharp on a twenty-foot screen, yielded an enlargement with a texture like a newly-macadamised road. As a matter of practice we have found that about three diameters is the limit for enlarging from ordinary plates of studio rapidity, that is to say, if the prints are to be in any way comparable with those taken direct of the full size. We have found that from a fourth of a quarter-plate a good cabinet enlargement can be made, and from a fourth of a half-plate a decent whole plate.

* * *

Effort and Efficiency. In common with all other trades and manufactures, photography will have to be carried on under different conditions when the war is ended and competition becomes keen again. The old standard of wages has been swept away, and photographers will no longer be able to undersell their competitors by working their staffs for long hours for little pay. When a fairly good printer could be hired for twenty-five shillings weekly, it was easier to take on extra hands during a busy period, than so to organise the work that it could be handled with success by a smaller number of better-class workers. Anything which can be obtained at a small cost is liable to be wasted without its being observed. Take water, for example. When the supply is unrestricted taps are left running to waste and nothing is thought of it, but let the supply be by meter and it is at once realised that what is wasted has to be paid for. So it will be with more expensive labour; it must not be wasted; our work-rooms must be overhauled and labour-saving devices installed wherever it is practicable. Every step taken unnecessarily is a waste of wages, therefore things should be so arranged that work is transferred from one person to another with the minimum of effort. Manipulations should be simplified as far as possible, and all odd jobs discouraged. If anything out of the usual routine comes in, it may be sent to a trade house, or if such work comes in frequently enough a small department organised in which it can be executed without interfering with the regular run of orders. This is done in one case we know of, and while the jobbing department barely pays its way, it justifies its existence by keeping obstructions out of the way of the general staff.

* * *

Testing a Portrait Lens. We had a rather amusing experience a few days ago at the premises of a professional friend whose acquaintance with lenses was confined to those of the modern type. The studio in which he had been working was supplied with large anastigmats, but this being no longer available he was launching out for himself, and had obtained a portrait lens of a suitable size for trial. He started in the accepted way with a large diagram built up of lettering and vertical and horizontal lines, was simply horrified at the poor show which the portrait lens made when compared with the anastigmats of equal aperture, and was for returning the instrument without, as he said, wasting a plate upon it. Seeing that the lens bore a well-known name, we asked him what class of work he wished to do with it. Obtaining this information, we suggested that he should try a portrait under his usual conditions. He did so, and found the result eminently satisfactory. There is not far to seek for the reason for this. In the first place he was testing the lens over a much greater angle than he would ever need; the anastigmats covered this angle, but their superiority was wasted. The portrait lens had a curved field which favoured a sitting figure, while the superior correction for spherical aberration gave a crisper image than that given by the anastigmat at the same opening $f/4$. Our friend is now happy in the knowledge that he can still obtain serviceable lenses though the making of anastigmats is temporarily suspended.

* * *

Amateur Plate-Making. In reference to the latest manifesto of the plate makers, old established firms may be able to find the necessary quota of glass from their out-of-date negatives, but the man who started only a year or two before the beginning of the war will hardly be able to do so after a month or two. The heavy cost of commercial plates will doubtless induce some of our amateur readers to try their hands at coating a few on their own account if they have a convenient dark-room and some arrangement for drying the plates. Formulæ and working details are given in most good text-books, and those who possess the older volumes of the Almanac will find a mass of interesting information therein. It may be remarked that it is not wise for the small maker to attempt to make a rapid grade of plate, and he must not be discouraged by a failure or two in his early attempts. Small batches of a couple of ounces of emulsion are best to commence with, so that failures will not be unduly expensive. The greatest difficulty is likely to be found in the drying, and we would advise the novice who has no light-proof drying cupboard to resort to the calcium box which we have so often recommended. With this no heat or ventilation is necessary, and being hermetically sealed neither dust nor vapours can reach the sensitive surface while wet. The one thing necessary is to have plenty of chloride of calcium. Seven to fourteen pounds is not too much for a medium sized box.

ON THE UNMOUNTING AND RE-MOUNTING OF PHOTOGRAPHS.

Perhaps next to the copying of faded originals one of the odd jobs which is most unwelcome to the photographer is the de-mounting of a miscellaneous lot of photographs and their re-mounting, as is most usually required, in an album. It need hardly be said that the work is of some delicacy, and it is just as well that its character should be made clear to the customer. Some people are quite ready to believe that the photographer can do anything which comes however remotely within the sphere of his business, a compliment in its way, but one which is apt to react unfavourably should any accident occur. Therefore, as a means to some degree of protection it is good policy to explain that the removal of prints from their mounts is by no means a process unattended with risk to them, and on this understanding a customer who is not altogether unreasonable is ready to make allowances should any mishap occur to any of his prints.

So far as the work of getting the prints off the mounts is concerned, it is necessary to bear in mind that mountants differ very considerably in the firmness of adhesion between print and board which they produce. The dextrine mountant which has been so largely employed for some years past will usually soften sufficiently to allow of the print being removed if the mounted print be laid between sheets of blotting paper, but in the case of a print on either gelatine or collodion print-out paper this is a procedure which involves considerable risk to the image. For reasons which are not very evident a print of this kind when thus treated will often fade to a considerable degree, and even in the case of bromide or gaslight prints or those by the carbon or platinum process (though the two latter to a lesser degree) there is the danger of damaging the surface. And then it is pretty certain that among a miscellaneous lot of prints which is brought for this description of treatment some at any rate will have been mounted with starch, an adhesive which forms the hardest cement between the print and the mount and one which no amount of soaking will soften in the least degree. On all these accounts, therefore, the safest course is not to damp the prints at all, but to work upon them in their dry condition, a method which is really a good deal easier than may appear at first sight. The procedure to be followed consists in shaving down the mount from the back or, rather, in splitting layers off it with a thin knife, continuing this process until the mounting board has been reduced to the thinnest substance which can be attained in this way. Having reached this stage, it will be found that the print can be separated from the thinned mount by laying it film-side down on a flat surface and, having detached the print at one corner, steadily bending the mount away from it by curving it (the mount) in an upward direction. From this description the process may seem, to those who have not tried it, a somewhat unpractical one, but a trial of it on a small scale will give an idea of the way in which it works. If one takes an envelope to which a postage stamp is firmly stuck and lays it stamp-side down upon a smooth table and then, holding one corner of the stamp, pulls the envelope upwards, at the same time bending it back, it will be found that usually the stamp will come away perfectly with a thin film of the envelope paper adhering to it. By operating upon the mounted print in the same way a little experience will show that the detachment of the print by this method is a fairly certain process. Should the print come away with portions of the mount of any appreciable thickness still adhering to it, these parts may be rubbed down with fine sandpaper until the print is of a uniform thinness suitable for re-mounting.

In the work of re-mounting prints a strong adhesive is necessary inasmuch as they may often require to be handled without wetting, and the extra layer of mount which still adheres to them makes them somewhat stubborn as regards lying flat upon their new supports. A stiff dextrine mountant will suffice in many cases, but glue is a better adhesive, and is best applied by coating a thin layer of it upon a warm slab of glass or marble, then laying the print face upward upon it, and when it has picked up the glue placing it in position on the mount and well rubbing down. We have said nothing about the dry-mounting process, but, of course, prints which have been mounted by it may be easily taken off by heat in the usual way, or may often be readily detached by holding the print where it will get the strong heat of a stove or an open fire.

PLAIN SALTED PAPER.

[For the photographer who has the taste to prepare his own printing paper there is no better choice than that familiar to a past generation as "plain salted." The following directions from "American Photography," for preparing it are by a modern exponent of this and other home-sensitised papers.—EDS., "B.J."]

Of photographic printing methods, the oldest—plain salted paper—has been responsible for some beautiful and satisfying results. All colours from a sort of brick red—to be had by merely fixing in hypo—to warm black—to be had by toning with platinum—are attainable by its use by straight methods. And, should we wish to go further, by the use of uranium the most brilliant of Bartolozzi reds are possible. For a vignetted portrait of the head and bust feminine order there can be nothing more artistically appealing than this red chalk photographic effect.

In the old photographic pre-albumen collodion and gelatine days plain paper was the mainstay of the professional worker, and never were results from an artistic standpoint more satisfying, though much no doubt depended upon the capacity for art endeavour of the man who had the job in hand.

In essentials the "plain paper" of the present is the same as the "photogenic paper" so painfully worked out in the thirties of the last century by Fox Talbot—an unfortunate circumstance truly that the original name did not continue. Photogenic, meaning "produced by the sun's rays," is surely more fitting than "plain salted paper."

Plain paper should appeal to workers of artistic impulse more especially to-day when because of cost platinum papers are out of the question for many. It was for long the method *par excellence* for workers of fastidious tastes, and was only pushed aside when ready-sensitised printing mediums became an article of commerce. Worked at its best, it is the peer of kallitype with the added advantage of being a "print out" paper, hence the image need not be over or under printed. Here is a paper that presents an image as visible as Solio and is as easily worked. All colours obtainable with Solio by gold toning are equally possible with plain paper, and if resort be had in after operations to toning with iron or uranium the whites are certain to be pure and unstained, which is not the case with some others.

Any good linen paper will serve, smooth stock for fine detail, rough surface for broad effects. I know of no more satisfactory stock than Strathmore water-colour paper, medium, rough, and smooth. For ordinary purposes the best quality of ledger paper most admirably serves. For small sizes choice writing papers have been advantageously employed. Whatever the paper used, it must have a good coating of size if one would have rich velvety effects. Good prints may be made on best quality ledger papers if sensitised exactly as it comes from the maker, but better when arrowroot is applied in thin coating by home effort. Size may be made as follows:—For every ounce of water beat up five grains of arrowroot. With a spoon beat up the powder in a little cold water, then add to the whole, and in a porcelain tray bring to a boil when the milkiness at first present will disappear.

Float the paper or apply with a flat rubber sponge, and when effected, hang sheet by one corner to dry. If a second time sized, then hang up by the opposite corner to dry.

Salting solution, average purpose, may be as follows:—

Distilled water	16 ozs.
Cupric chloride	128 grs.
Gum arabic	128 grs.

Potassium bichromate solution from 1 to 10 drops or minims.

The potassium bichromate solution may be made up by dissolving 10 grains of the salt in an ounce of water. Its employment results in more or less increase of vigour. By its use flat outlined negatives are made to render vigorous prints.

This may be considered a maximum strength; 8 grains of copper to the ounce, but there are cases where half that amount will answer.

Salting in the case of sheets of moderate size may be effected by floating. Immerse the sheet by first bending it so that the centre first touches the liquid, then let go of the ends and continue to float for a minute when the paper is hard, half that time when it is porous. Take hold of the sheet and drag it across the end of the tray; then hang up by one corner, in a not too chilly room, to dry. By thus hanging by a single corner the surplus gravitates to the opposite one, when it may be easily removed with the finger or permitted to drip.

Other chlorides than the copper can be employed—ammonia, strontium, sodium serving equally as well, save that there may be some variation in resulting colours, and perhaps a different quantity may be required.

Sensitisers may be prepared as follows: To each ounce of distilled water employ 55 grains of silver nitrate, 25 grains of crystallised citric acid, and 2 grains gum arabic. Filter before using.

Pin sheets to a board or hold by clips to a sheet of glass. Do not pour sensitiser on the sheet, but have it in a porcelain tray or soup-plate. Apply quickly with a flat rubber-bound camel's hair brush, avoiding hesitating, dilatory strokes, else brush marks will show. The main idea is to flood the surface as quickly and as effectually as possible, getting all of it on before any one part has had opportunity to get dry.

On rough paper one coat is usually sufficient, but on ledger paper a second coat is advisable, thus making certain of rich, deep, juicy shadows, and no suggestion of overlapping brush marks.

Experience alone can determine how far to carry printing. In any event it must be deep, much deeper than is the case with Solio Printing must be carried far enough so that whites are buried.

When printing has been effected, wash for five minutes to get rid of free silver, then tone in a gold bath, say, a grain of gold to 20 ozs. of water made alkaline with carbonate of soda or borax. Test for alkalinity with red litmus paper.

When toning is effected rinse in water and fix in hypo of a strength of one to ten of water. Ten minutes in the fixing bath will suffice.

Do not have the toning bath too alkaline, otherwise the half-tones will suffer.

Paper sensitised on an acid bath will keep for perhaps ten days if compressed between the pages of a book. Some prefer the ammonia-nitrate method, and no doubt it results in deeper and more velvety shadows, being also most adaptable to the gold toning. Those who would like to try the ammonia-nitrate method can do so by placing the paper here involved in a pasteboard box, pouring a few drops of ammonia (stronger) on the inside of the lid, putting on the cover and leaving it thus sealed for a quarter of an hour. By the end of the allotted period the fumes will have got in their work.

Paper thus treated must be prepared from day to day. The professional workers of old were obliged to do so. Salted paper, however, can be kept ready for the silvering, and a few minutes may be devoted to that task exactly as the sensitised material is needed. I have usually sensitised such paper as I would be likely to need the night before printing on it. This, however, was acidified paper that could be held over a day or so.

Water colourists who have found difficulty in working on emulsion papers are delighted with this, and an added advantage is the absence of all tendency to curl.

James Thomson.

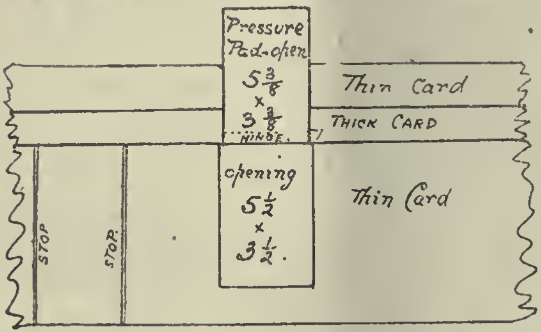
Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Strip Printers.

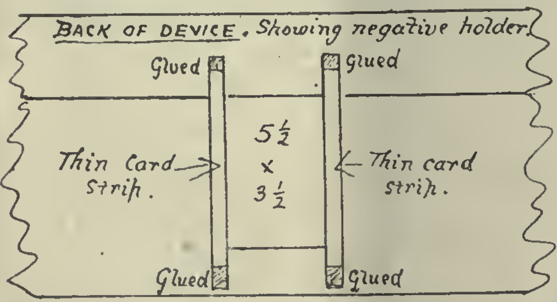
The supply of "six-on" printing frames for bromide postcards is limited, and presently it may be difficult to get them at all. As a substitute I find that a home-made apparatus will produce equally good results, and being made of cardboard costs practically nothing. I am assuming that the worker has his own exposing light-box or table fitted with the usual plate-glass bed, an indispensable apparatus to the man who has all sizes to print.

The device described is suitable for printing full-cut postcards from half-plate negatives, but can be easily adapted for vignette heads from smaller negatives, or for printing with a white margin.



A piece of very thin card or stout art mounting paper is cut about 24 inches long by about 8 inches wide, or wide enough to well cover the glass bed. An opening 5½ by 3½ is cut in the centre of this card. A piece of stout card (cut from a waste mount) cut 24 inches long and about two inches wide with a perfectly straight edge is pasted on the card close up to the top of the opening as shown in the sketch. This acts as guide in sliding along the strip cards, and also keeps the device rigid. The next step is to mark the divisions, 3½ inches apart, and this can be done by glueing narrow strips of card on the device, or by making a bold ink line on the long cardboard strip.

To make an effective non-cockling pressure pad, cut three pieces of stout card 5⅜ by 3⅜, rub mountant into one of the cards on both sides, place the other cards in contact so that the one containing the mountant is in the centre, and put this under heavy pressure for a few minutes. This pad has to be hinged to the cardboard strip so that when closed it leaves a tiny margin round the 5½ by 3½ opening, thus ensuring good contact. The hinge can be made from linen, or canary fabric, but must be sufficiently strong to prevent any side play. To make a handle for the pressure pad a strip of thin card can be bent to form an inverted T, and glued to the centre of the pad.



The last step is to make the negative carrier. As there is no drag or friction on the negative itself, the carrier can be simply two strips of thin card glued to the back of the device as shown in the sketch. These strips hold the negative quite well, and provide for the necessary adjustment, but it is necessary to fasten the device temporarily to the exposing table with gummed strips at the top edge. To use the device, lift it up an inch or two, slide the negative in the card strips, drop the device, switch on the light and adjust the negative.

To print with a white border the device should be as described with the opening 5½ by 3½, but should have strips of thin black paper fastened to the edges of the opening so as to produce a ⅜ or ¼ inch border.—R. R. Rawkins.

A Note on War-time Plates.

Most photographers are aware that war-time plates are not by any means as good as they might be. Among other things that I have noticed to my cost among my war-time negatives is that, even after the plates are dry, the films are exceedingly delicate and easily damaged. The other day two plates, after being taken from the drying racks, were placed film to film while being carried upstairs, and the result—though no grit or dust was present—was a couple of scratched negatives. The plates were of a well-known brand, and though I have exposed thousands of them, I have never found this trouble until recent batches came to hand. Few workers nowadays go to the trouble of varnishing their negatives, and under present regulations can hardly do so, but it certainly seems that if present conditions continue extra care requires to be taken. Every operator should regard sensitive material as different from pre-war standard, for experience has proved to me that this is the only safe way, and, by way of warning and assisting in avoiding possible trouble, the above note is penned.—Expert.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Folding Cameras.—No. 117,399. (Dec. 31, 1917.) The invention relates to a camera of very small size, and without projections, when folded, and is characterised particularly by the channel-shaped supporting struts of the lens-front, mounted so that their base is concealed in the camera casing.

The camera comprises a casing 1, consisting of front and rear sections 2 and 3 respectively, each of which has its end corners rounded off. A mounting frame is permanently secured to the front section 2, and adapted to be completely housed when the parts of the casing 1 are assembled. A central aperture 2^1 is provided in the section 2, which extends across the breadth and major portion of the length thereof, which is normally closed by the lens plate 8 when the camera is collapsed or folded. This plate carries the usual lens, including a shutter, a finder glass, and timing elements, and the top and lower edges of it are formed to provide rectangular offset portions 9, 9^a, and 9^b, the latter having a knurled gripping surface, 14, which supplies a ready means for pulling out the plate when it is desired to use the camera. Pins 19 are fixed between the portions 9 and 9^b, the pins being located as near the lower or inner corners of the portion 9^b as possible, the space between the members 9 and 9^b forming a bearing for the strut 17 during the movement thereof incident to the movement of the lens plate 8 to its operative and inoperative positions, and also serving as a housing for the struts when the camera is folded.

Furthermore, by locating the pins 19 which are adapted to travel in guide-ways 16, provided in the strute 17, in this manner, a greater focal range may be obtained from struts of a minimum length when the lens plate is extended. The struts 17 are journaled in the mounting frame by means of rods 17¹ passing through aligned openings made at the base of the struts and in the sides of the frame. The journaling of the strute 17 is such that they are positioned with their bases normally concealed, and when extended their rotation is limited by the edges thereof engaging the adjacent edges of section 2, which latter feature furnishes a means for exerting a pressure inwardly when the lens plate 8 is extended its full distance so as to maintain it in fixed extended position.

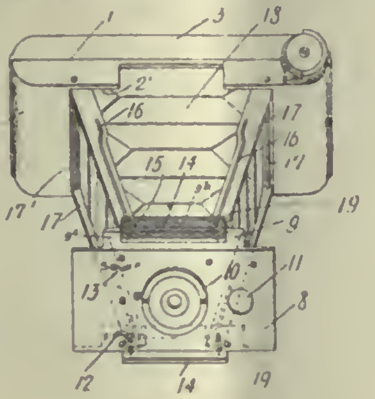


Fig. 1.

In other words, by locating the base of the struts 17, as shown, when they are rotated outwardly by pulling out the lens plate 8, the base of each of the struts abuts against the adjacent edge of section 2 as the lens plate approaches the limit of its travel. By a continued outward movement of the lens plate until it reaches the end of its travel, the body portion of each of the struts is slightly flexed, and this flexure is such that the free ends of the struts are caused to move towards each other, permitting the transverse end portion of the channel members 16 to move into engagement with pins 19 upon the release of the lens plate 8.

The construction of the struts is illustrated in fig. 2. They are formed from a single piece of metal having the ends bent at right angles to the central portion so as to form a U-shaped piece. The guide-ways 16 are shaped as shown, terminating at one end in slotted portions made at right angles to their main channels. These slotted portions function as a means for locking the lens plates in an extended position by co-operating with the pins 19. The guide-ways 16 are comprised of two straight channels, having different longitudinal axes and joined by a curved channel. The corners 5 formed adjacent to the central portion are cut away on one side, and the bearings are located nearest the cut-away corners. Removing these corners and locating the bearings permits the mounting of the struts so that their base portions are concealed underneath the casing 1, yet they are free to rotate a substantial distance. One edge 4 of each arm of the strute is tapered, so that when the lens plate is moved, because of this feature and the conformation of the guide-ways 16, the arms of the struts may freely pass to and fro between the gripping members 14 and the turned-over edges of the lens plate 8, and when the plate is in normal position the exposed edges of the struts will lie in a plane common to the front face of the camera.—Magnus Niell, 25, West 52nd Street, New York.

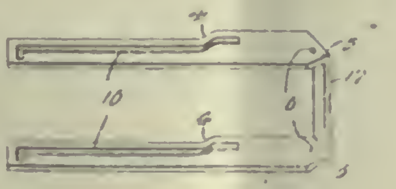


Fig. 2.

Trade Names and Marks.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

MECORL.—No. 382,919. Photographic chemicals, plates, and films. Reginald Evison Carter, 39, St. James's Street, Piccadilly, London, S.W.1; manufacturers' agent.

ALPHA.—No. 383,031. Prepared paper for photographic purposes. Ilford, Limited, Britannia Works, Roden Street, Ilford, Essex; manufacturers of photographic plates, paper, and films.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SATURDAY, SEPTEMBER 7.

Halifax Scientific Society. Outing to Norwood Green.

TUESDAY, SEPTEMBER 10.

Keighley and District Photographic Association. Annual General Meeting.
Hackney Photographic Society. "Lantern-Slide Making." A. J. Linford.
Manchester Amateur Photographic Society. "Rambling A-Wheel." E. Pickstone.

THURSDAY, SEPTEMBER 12.

Hackney Photographic Society. Outing to Lord's Bushes.

FRIDAY, SEPTEMBER 13.

Halifax Scientific Society. Lecturette at Chelsea Valley.

Commercial & Legal Intelligence.

NEW COMPANY.

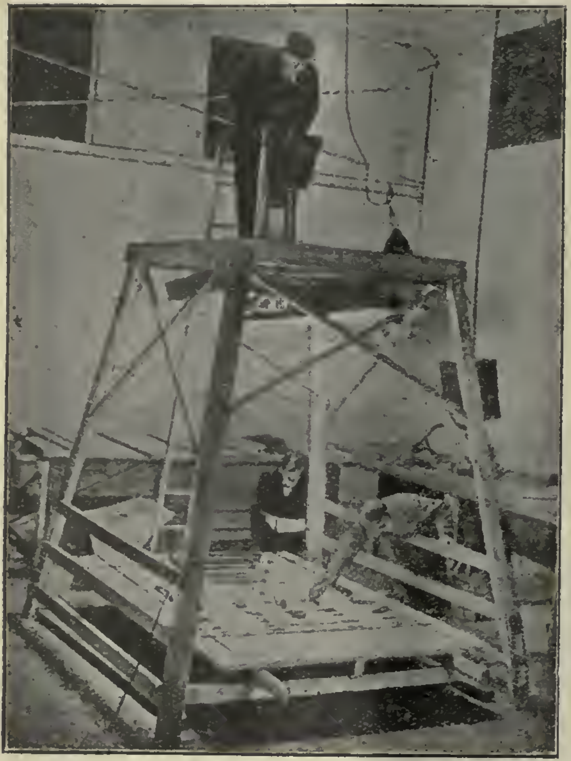
CONSOLIDATED EMBOSSING CO., LTD.—Private company, registered on August 24, with a capital of £2,000 in £1 shares, to take over the business of photographic enlargers, carried on by F. S. Hornsby and G. Jones at 175, Grove Street, Liverpool, as "The Consolidated Embossing Co.," also to carry on the business of manufacturers of and dealers in picture frames, photographic paper, chemicals, etc. The subscribers are:—F. S. Hornsby, 40, Hamilton Street, Hoole, Cheshire, photographic artist, 300 shares; G. Jones, 21, West Bank Road, Birkenhead, Cheshire, engineer, 300 shares. The first directors are:—F. S. Hornsby and G. Jones (both permanent). Registered office: 175, Grove Street, Liverpool.

METHYLATED SPIRIT.—Reference to the use of alcohol for industrial purposes, says the *Chemical Trade Journal*, is made in the report of the Commissioners of Customs and Excise for the year ended March 31, 1917. In the year 1916-17, 4,115,985 gallons of industrial methylated spirit, as compared with 4,082,516 gallons in the previous year, were used in manufacturing operations and for other purposes in the United Kingdom, the most important sources of consumption in both years being the manufacture of varnishes, linoleum, soap, ether, photographic plates and papers, alkaloids and fine chemicals, and smokeless powders, fulminates and other explosives, the quantity consumed in the manufacture of explosives increasing, however, from 294,273 gallons in 1915-16 to 614,116 gallons in the year under review. It is remarked that the increase has had the effect of directing the attention of chemical manufacturers and others to the manufacture of various products—fine chemicals, dyes, etc.—either not hitherto produced in this country or produced only in small quantity, in the manufacture of which the use of pure alcohol is a necessity. As a result, since the war commenced, a considerable number of new applications have been made for permission to receive duty-free spirits under Section 8 of the Finance Act, 1902; the great majority of these have been granted.

News and Notes.

Making Group Photographs of Machinery Parts.—The preparation of illustrations for a machinery catalogue (writes the "Scientific American"), is more than a mere matter of photography; it calls for no mean skill in staging the various parts and the descriptive text so as to secure the most striking results with the minimum of effort.

How such work is done is briefly told in the accompanying illustration, which depicts the photographing stand employed by the photographers of a well-known automobile manufacturer of Toledo, Ohio. The stand carries two platforms, one for the parts to be photographed, and the other for the camera and its operator. Light is furnished by four Cooper-Hewitt mercury-vapour tubes, hung underneath and near the edges of the platform. The greenish light of these tubes, as is well known, has splendid actinic properties, and as a result the exposure necessary is reduced to a minimum.



The machinery parts are shifted about on the white cardboard table below the camera until the proper arrangement is secured. If desired, descriptive text in the form of printed slips of white paper can be placed next to the part described, and in that manner much time and labour is saved, since one photograph makes for a complete catalogue page. The boundary of the photograph is marked by black wooden strips, and the camera operator focusses his instrument so as to take in all the platform below within the markings.

Enemy Firms.—The Board of Trade have published an order for the realisation and distribution of assets of the British Ferrotype Company, 246, 248, and 250, Waterloo Road, Blackpool, manufacturers of cameras, etc. Controller: John Grant Gibson, Byrom Street, Manchester.

Acid-fixing without Acetic Acid.—The Ansco Company, as mentioned in its monthly organ, "Portrait," has found the following short-step and fixing bath, recommended as a substitute for the hypo-acetic fixing bath, to work correctly for those who are unable to secure acetic acid.

Important.—The use of a short-stop between developing and fixing of the prints is absolutely necessary, and a bath should be prepared as follows:—

Short-stop Formula.

Water	32 oz.
Citric acid	½ oz.

Rinse the prints in this bath immediately after developing and before fixing. Fix the prints in a solution prepared as follows:—

Fixing Bath Formula.

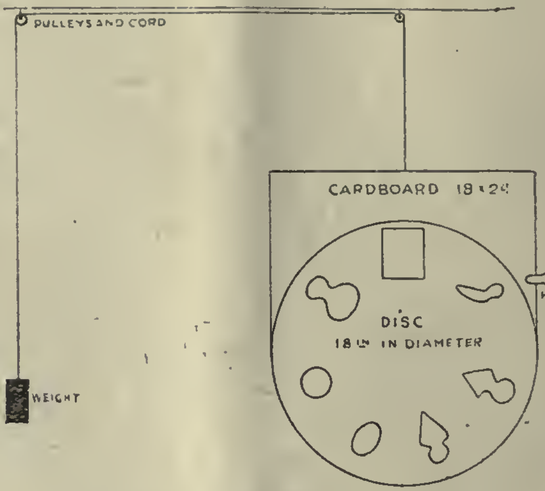
Water	60 oz.
Hypo	1 lb.

When dissolved, add the following hardener:—

Water	4 oz.
Sodium bisulphite	2 oz.
Powdered alum	1 oz.

A Multi-Vignetter for Enlarging.—Mr. John Baer, 1213, Lydia Street, Kansas City, Mo., sends to "Portrait," the organ of the Ansco Company, a sketch and description of an enlarging vignetter that is so good that we pass it along for the benefit of our readers.

The diagram of this vignetter practically explains itself, so there is little need for an extensive description here. It consists of a large sheet of cardboard, 18 by 24 ins., to which is attached two discs, 18 ins. in diameter, also made of cardboard. These discs are held in place on the large sheet, and can be moved to whatever position is desired by means of a milled screw.



The cardboard sheet has a square opening in the centre, and each disc likewise has the same size opening to correspond. The discs, besides, each have six openings of various shapes and sizes which, when used, alone permit of twelve different vignettes, and when used in combination, of an almost unlimited number. When projecting prints, this vignetter is suspended between the enlarging camera and the easel at the required distance, and produces very effective results.

The cardboards are fastened to the ceiling by a rope and pulley arrangement, as shown, and the counter-balancing weight makes it extremely simple to handle the vignetter easily and run it out of the way when not in use. Such a device can be made in whatever size a photographer finds convenient for his requirements.

A Croydon Ex-President Reproves Recruits.—A squad of recruits is not likely to forget Mr. H. P. C. Harpur in a hurry. It appears that the ex-president had been indulging in a well-earned golfing holiday, and was leaving the links flushed with pleasure at having triumphed over his antagonist (details of the game would fill several issues of this journal), when he met twenty or thirty Tommies in charge of a corporal. "That cove ought to be on the land," loudly said one for all to hear, and a murmur of assent ran through the ranks. "Stop that squad!" came in stentorian tones from the cove alluded to, and the corporal immediately brought it to a halt and to attention, probably being under the impression he was being addressed by a retired field marshal.

The squad then got it hot at close range from one whose blood, self-confessedly, was at boiling point. Among other interesting bits of information, each individual man learnt that he was a miserable blighter for insulting one who had very much "done his bit"; one who had not previously taken a holiday since the war broke out, and had worked continuously and arduously at munitions, filling up nearly all spare time with special constable duties. The patriot might have added—even too busy to attend his beloved camera club, except on rare occasions. Ultimately, his temperature being somewhat abated, an intimation was given that the offenders might be removed, and the muchly impressed corporal gave the "quick march." Whether the squad required subsequent treatment for shell shock has not transpired.

Photography of Censored Documents.—At Thames Court last week, Abram Brilliantstone, Russian alien, was remanded on a charge of having in his possession a forged passport.

Mr. W. M. Webb, from the War Office, stated that he applied a photographic test to the document and found that under the names was written the name of Klauser, written in German, and other writing, which were undoubtedly forgeries. The test applied was merely a photographic one, and not a chemical test.

Defendant's Counsel: How do you make the test?

Mr. Webb: I don't want to tell you how to forge passports.

Nellie Klauser, 65, was also remanded on a charge of allowing Brilliantstone, her nephew, to have possession of the passport. The photographic test of her passport revealed the name of Melka, by which name she was known in Russia.

Tribunal Appeals.—At the Birmingham Local Tribunal a photographer, who worked four days a week in a munition factory, said that on the other three days—Saturday, Sunday, and Monday—he did business to the value of £600 a year. During those three days he had about 400 customers, and on the other days there were practically none. Five girls assisted in the business, and did what work they could while he was away. He had a partner, who had joined the Army, and received half the profits of the business.

The National Service Representative (Lieut. Leveaux) appealed against the conditional exemption granted to this man, who was 33 years old and passed for Grade 3, and said that an urgent wire had been received from London stating that photographers of every grade were required in the R.A.F.

The exemption was withdrawn, the man not to join the Army for one month.

At Aldershot Tribunal last week an appeal for exemption was made by a photographer, Grade 2.

The National Service representative refused to consider that the appellant was the only one left, and insisted that the tribunal should refuse the application, seeing that hundreds of professional photographers were wanted for immediate service in the Army.

Mr. Watters: A year ago we gave you a professional photographer, and he was immediately put into a different unit. At the last sitting we gave another professional photographer, a married tradesman, who was passed for service as a photographer, and that man had been made an inspector of aeroplanes, work which he knows absolutely nothing about.

Councillor Bateman thought that until the tribunal got replies from the authorities, and until young men were taken before elderly married men, the tribunal should refuse to sit.

Exemption was granted for three months.

The Ilford Panchromatic.—Messrs. Ilford, Ltd., have just issued a set of comparative prints which will be of the greatest interest to all concerned with the photographing of coloured objects. It consists of a coloured original and reproduction prepared, one on an ordinary plate and the other two on the screened and unscreened Ilford Special Rapid Panchromatic. The prints need only to be seen for the quality of the plate to be appreciated, and we are sure many of our readers will avail themselves of the Ilford Company's offer to send one of the sets to anyone interested in the subject.

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Hon. Secretary, 5a, Pall Mall East, S.W.

October 14 to November 30.—Royal Photographic Society. Entries close (carrier) September 20; (hand) September 21. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

A QUESTION OF CHARGES.

To the Editors.

Gentlemen,—Presuming that on the photographer's price-list a certain style of photograph is priced as follows:—

12 copies	£1	11	6
6 copies	1	1	0
3 copies	0	10	6
1 copy	0	7	6

Also presuming that a lady brings a young baby and a child about three years and asks for the following to be taken:—

Portrait group of three.
Portrait of baby only.
Portrait of child only.

Proofs are sent and the following order given:—

6 copies of the group of three.
6 copies of the baby.
3 copies of the child.

Would it be both usual and in order to charge these as follows:—

6 copies portrait group of three	£1	1	0
6 copies portrait baby	1	1	0
3 copies portrait child	0	10	6

or would it be usual to charge at the full dozen rate for the two lots of six, and thus charge £1 11s. 6d. for the two half-dozens?

It might be interesting to know what is the usual practice amongst your readers.—Faithfully yours,

S. E.

ADVANCE IN THE PRICE OF PLATES.

To the Editors.

Gentlemen,—I have been interested in the correspondence in the "Journal" re the increase in prices of plates and the condition laid down by the Plate Makers' Association. That more photographers have not written on the subject must not be taken as showing want of interest, because I have reasons for believing that there is a very strong feeling against the plate makers amongst the members of the profession. At present we feel our helplessness to deal with the matter, because once more the whole of the plate makers seem to have joined the ring. I suppose we are all looking forward to that happy time when the representatives of the various firms will be begging for orders, but that time is not yet, and the contemplation of that future bliss does not help us very much.

I wonder how many members of the Professional Photographers' Association feel satisfied with the attitude adopted by the P.P.A. as expressed in their "Grin and bear it" letter published a fortnight ago, and which proves once more that when it comes down to the real interests of the professional the P.P.A. is useless. Those of us who attended the meetings of the Congress will remember that, even in these days, it was recognised that something more was required than the existing P.P.A. Surely the time has come when an association, with its properly paid officials, who should be the servants of the Association, should be formed in the interests of the profession. Whether or not "County Associations" will meet the case remains to be seen. At any rate, I can assure Mr. Read that there are many photographers who will be watching Lancashire and anxious for the report of its meeting.—Yours faithfully,

H. C. M.

SHORTAGE OF GLASS.

To the Editors.

Gentlemen,—If "A Victim" will state from whom good negative glass can be purchased at 8d. per foot we shall esteem it a favour.

Let us remind him that the trouble and expense of cleaning, of used negative glass, is higher than the price given for such glass, and that the number of "throw-outs" is considerable, as the old image has a knack of contributing to spirit or spiritualistic photography.

For The Co-operative Plate Works, Ltd.,
Archer Clarke, Managing Director.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

S. D. W.—1. Practically weight for weight in substituting soda for potass metabisulphite. 2. So far as our experience has gone there is no objection to hardening prints before the use of hypono. 3 Ordinary or chrome alum solution.

J. H.—The best way, perhaps, would be to advertise the business either in a photographic or daily paper, and see what result you get. Or you could place it in the hands of a business agent, such as Abbott, Booty and Co., 11, Clarence Road, E. Croydon.

B. B.—The Regent Street Polytechnic School of Photography commences a new session on or about September 27. The secretary will send you a prospectus upon application. We hardly think a good class firm would be willing to accept the partial service you are able to offer, Sunday work being only undertaken by the cheaper class of studio. There is a special class for amateur photographers at the Battersea Polytechnic, Battersea Park Road, S.W.; it might be worth your while to apply to the secretary for particulars.

New Retail Businesses.—We notice in your report of the meeting of the P.P.A. that they were informed by a branch of the National Service that, provided the particular business in question was confined to "photography, miniatures, and enlargements," no licence was required. As we are anxious to open new branches and also to execute a removal, could you inform us whether we should require a licence in either case? Our business would, of course, be "photography, miniatures, and enlargements" only, and we should not employ any men whatever.—C. S.

We can only tell you that the Retail Business Order of 1918 states that no person shall open a retail trade or business at premises not theretofore used by the retailer for such trade or business without a licence. Photography, or any branch of it, is not mentioned in the Order, and our interpretation of it is that in both cases mentioned by you it would be necessary to *apply* for such licence. In any case, you can satisfy yourselves by addressing an application to the Director of National Service, Technical College, Cardiff.

D. D.—The chemicals appear to be in good condition and of good quality. The best way to test them is to make a little developer and see the result. The pre-war price of hydroquinone was about 5s. per lb., and that of the bromide 2s. lb.

Acetic Acid Substitute.—You will find a formula recommended by the Ansco Company for a citric acid short-stop and acid fixing bath, which will probably meet your requirements.—J. H. M.

C. W. C.—Engineering work with a camera calls for rather a good deal of experience owing to the many very difficult subjects which the engineering photographer is called on to undertake. There is no book on the subject. You will find a good many hints on the photography of machines etc., in the little volume "Commercial Photography," which our publishers issue, price 1s. 2d. post free. Slow plates are not very often used, the lighting conditions are such that it is necessary to use a comparatively fast plate inasmuch as many engineering jobs have to be done within a narrow limit of time owing to the obstruction the photographer causes in the works. Blocking-out and the working-up of prints is an essential part of the work. As regards blue-printing the operations are very simple either when daylight is used or an electric printer is available. There is a good book on these printing papers, namely, "Photographic Reproduction Processes," by Duchochois, price 2s. 6d., Hampton and Co., but it is rather old and really a great deal of the information in it is quite unnecessary for the practical use of the papers.

Studio Lens.—Will you kindly say what would be the best all-round lens for studio use, mostly postcard negatives? 20 feet from sitter to lens. Studio light not strong, rapid lens required as we photograph many children. Would a Ross No. 3 Rapid Cabinet suit?—O. F.

Yes, you want a lens of about 12 inches focus, which is the focus of the Ross No. 3. An alternative is the Dallmeyer 3B. of 11 inches focus. Either of these lenses would be first-rate for your requirements, which, apparently, call for the largest aperture.

Camp Photography.—My chief line is military portraits of soldiers, etc., camp work, but the restrictions are so great here that I am not allowed to work. Should be pleased if you could give me any information as to any other part of the country where I could follow up outdoor photography, preferably where there are military stationed.—E. R.

We are afraid it is scarcely possible to make any definite recommendation as to a part of the country where there are no military restrictions upon outdoor photography. Our experience is that those restrictions cover practically the whole of the country, and, moreover, are liable to vary from week to week.

The British Journal of Photography.

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SUMMARY.

The threatened shortage of fuel is a matter deserving of serious consideration; although the rationing Order has now been in force for nearly three months, few people seem to have given it any attention. The situation is reviewed on page 410.

A point of interest to photographers turning on the class of subjects forbidden to be taken under the Defence of the Realm Act was raised at the West London Police Court last week, but no decision was arrived at. (P. 411.)

The possibility of utilising or of turning into cash many items of waste material which have hitherto been destroyed or left for others to make money of is indicated on page 409.

Communications dealing with the question of proper charges for mixed orders from two points of view, and several long letters on the rise in the price of plates and the action of the P.P.A. in relation thereto will be found on page 417.

A recent paper by Mr. F. W. T. Krohn before the Royal Photographic Society describes the author's observations of the variation of the inertia of a plate with the development factor, and by reference to distribution of the developed grain in the emulsion film propounds an explanation of this variation. (P. 412.)

Notes on cutting sensitive dry-plates and the precautions necessary to secure accuracy of size and freedom from scratches, with some practical observations on the packing of plates, appear in "Assistants' Notes" on page 414.

A simple and useful drying cupboard, mainly intended for roll-film but equally applicable to prints, is described on page 416.

Specifications, with illustrations, of an invention for producing "living" portraits by means of a camera in which an improved line screen is actuated by a motor, and a method of making cartoon cinematograph films are given under "Patent News" on page 415.

The dry-mounting press, when heated by gas, often becomes an insanitary nuisance for lack of a little intelligent overhauling, and a hint on the best way of accomplishing this is given on page 410.

A suggested method of executing "repeat" orders from positions of which the negatives have had to be sacrificed under the platemakers' ukase is detailed on page 414.

Pellicular negatives which consisted of the gelatine film stripped from a glass plate were in use many years ago. In view of present conditions, their resuscitation would seem desirable. (P. 410.)

The winter session of most of the Polytechnics and technical institutions will shortly commence. Particulars of a course on wet-collodion at the Manchester College of Technology will be found on page 413.

EX CATHEDRA.

As Others See Us. One of the disadvantages of building up a business is that we are very apt to overlook faults that are most palpable to an outside observer. The photographer, like any other business man, may have his own ideas of what is good enough for himself and quite miss the points which would render the premises attractive to the public. If he is a good photographer, he is apt to consider the quality of his work to the practical exclusion of all else, and there is always a danger of a general dinginess settling down upon the whole establishment without its being noticed. This is fatal nowadays. The public does not expect to find a combination of a dentist's waiting room and a workshop, but a bright, tastefully arranged suite of rooms, which help to raise the spirits of the visitor rather than to depress them. After all, in some quarters there are grounds for the old jape about a visit to the photographer's being as bad as a visit to the dentist's, and this not because of the actual manipulation in the studio, but on account of the appearance of the place and the procedure adopted. It has been said that competition is the soul of business, but it is no less true that emulation is the mother of efficiency, and it would not be altogether a bad thing if photographers could get on visiting terms with each other and thus develop a little of the house-pride which is inherent in every woman who has a home of her own.

* * *

Salvage. We are at last arriving at a consciousness of the fact that matter is indestructible and that although any particular substance may change its form it is still available for some other use. There is a certain amount of irrecoverable waste, whereby material is lost for all practical purposes, as, for example, the rubber worn from tyres, the leather from our shoes, and the gold from coin. On the other hand, there is much that has been regarded as worthless material that has in the past made the fortunes of those who knew how to utilise it. At the present time its salvage may help to meet the growing cost of materials if we will take the trouble to preserve and market it. In a previous issue we printed a paragraph pointing out that empty tins have now an appreciable value. Bottles and jars of all kinds, which were at one time consigned to the waste tub, can be sold either to the rag dealers or in many cases returned to the manufacturers from whom they were procured. When most of our chemicals came from abroad it did not pay to return the bottles, but now chemicals are made at home and bottles are scarce there is reason for doing so. The sudden jump in the value of old negative glass is the most striking instance of how war conditions alter market values; but in other directions the appreciation is almost as great: the rougher kinds of paper, plate boxes, broken strawboard, small bits of corrugated paper and film backings will all fetch a fair price if tightly packed in sacks or baled, while ordinary paper, such as old books, invoices, circulars and the like, sell at three or four times pre-war rates. Every bit of waste celluloid is wanted for varnish making purposes; even the bits perforated out of cinematograph films are thus utilised. Old brass and copper fittings and zinc in any form is valuable, while old electrotypes and process blocks fetch quite a lot of money.

* * *

Pellicular Negatives. The fact that plate-makers are now willing to re-coat glass in small sizes makes the suggestion of a correspondent that stripping plates should be again placed on the market of more interest than it would have had when glass was plentiful. Many years ago the Rev. H. J. Palmer described a process by means of which he stripped the gelatine-emulsion film from the glass support before exposure, again attaching it to a rigid support for development. In so doing he was endeavouring to secure the advantages of the modern celluloid film—portability and freedom from halation. It would seem, however, that there is a real opening for a good stripping film which could be left upon the glass as long as desired and then stripped and stored away. When we consider the vast amount of storage room occupied by negatives which probably will never be ordered from, it would be a boon if, after the original order was executed, the film could be removed from the glass, put away in an envelope, and the plate returned for re-coating. Celluloid films possess some of the advantages of gelatine pellicles, but are apt to buckle with age, especially in large sizes, while their inflammability is also a serious drawback where a large number has to be stored. Films on paper temporary supports have been introduced from time to time, but have not been altogether successful; the fact that they could not be stripped dry and the necessity for stripping before the substratum became insoluble was against their general adoption in professional work. The Cristoid film was a very fascinating material to work, but the extra manipulations involved and the danger of distortion in drying made it unsuitable for use where assistants were employed. On the whole, the plate which is outwardly normal but capable of being stripped at will would be a boon not only on the score of storage and glass saving, but to carbon printers who need a reversed negative.

* * *

The Mounting Press. If there be one class of tools or appliances which never gets a kindly touch until it breaks, it is the tribe of gas stoves, geysers, and dry-mounters. So long as these will light up they are considered to be in good order, and no labour is wasted on seeing that all the gas and air-ways are clean and that the proportions of gas and air are properly adjusted. The ordinary boiling ring is, perhaps, the Cinderella of the family, but the dry-mounting press runs it very close in the matter of ill-treatment. In most presses the gas burners are contained in the thickness of the moving platen, and consequently they are out of sight. Upon examination it will be found that the pipes are held in by screws, and upon these being loosened the burners may be withdrawn for cleaning. As a rule it will be found that after a few months a good deal of dust and perhaps a little carbon from the gas itself has become charred round the tiny apertures, reducing them and causing uneven heating. The tubes should be well rubbed with a duster, followed by a piece of very fine emery cloth, and then the apertures cleaned out with a small jewellers' broach, which will ensure their remaining of correct and equal apertures. The gas and air inlets at the tap should be cleaned, and where there is a regulator it should be adjusted until the flames are clear and steady. Before returning the jets to their place the inside of the platen should be cleaned, as there is often an incrustation on the upper surface which causes a waste of heat. Some of the earlier models were faulty in their burning through insufficient ventilation, giving rise to an evil odour which is very bad for the health of anyone working near. This may be remedied to a great extent by drilling a few ⅜-inch holes in the top of the platen, care being taken that no hole comes over the gas jets.

THE FUEL ECONOMY ORDER.

ALTHOUGH the Order for economy in fuel—the "Household, Fuel and Lighting Order, 1918," as it is officially titled—has been in force since July 1, there are no doubt many who have not yet taken the positive steps which it aims at enforcing, and doubtless will enforce. In such matters as this people who have been unaccustomed for many years to regulate their affairs according to any prescribed code are apt to disregard even such systems of control until directly confronted with evidence of the power which authorises them. The Order, which is sufficiently outlined by the circular obtainable at any fuel control office in the kingdom, is explicit as to penalties and restrictions which may be inflicted in respect to its infringement. Rather than dwell upon these in any spirit of re-echoing official warnings, we would say a word by way of signalising the need of economy in all the agents which are employed in heating and lighting. Whatever form these take, the prime source is coal, and coal, by an evil concatenation of circumstances, is vitally needed by our Allies, Italy and France—the one producing scarcely any coal of her own and the other deprived of more than half of her coalfields by the enemy. For both countries, problems of freight on land and sea have been and are acute, so much so that in both coal and gas have long been severely rationed, and prices have risen in a way which will be understood by saying that last year coal in large quantities was costing Italian gasworks £8 per ton, and Paris gas was supplied at the rate of 16s. per 1,000 cubic feet. So severe has the situation been that many gasworks have had to close, whilst others have been compelled to replace coal by timber, olive husks and miscellaneous refuse in making gas of a kind. In these circumstances, our Allies can have recourse only to England for the material which Nature has bestowed upon her in such abundance. The fact deserves to be kept in mind and recalled in reference to the relatively slight privations which our economy campaign entails in this country.

The scheme according to which premises are rationed for fuel according to the number of rooms need not be repeated here. It was outlined as regards its essential points in our issue of July 12 last, and the official circular referred to above deals with it in detail. The matter to be chiefly considered is the means which can be taken to effect economy in electric current, gas, and coal. As regards electricity, the restriction of window lighting has already done a good deal to cut down consumption of current. In reception rooms, which usually from their purpose have been well-lighted apartments, there is a convenient opportunity for a lessened and different illumination which will not incommode either the receptionist or the customer. In many reception rooms it should be quite practicable to employ a much smaller number of lamps by dispensing with those for the general illumination of the room and the walls, and arranging a single lamp of fair power on a table which is large enough for the exhibition of specimens to customers, and also for such regular work of correspondence which the receptionist undertakes in the absence of callers. If the large ornamental pattern, with a shade of festooned silk or of fabric mounted on a skeleton framework, it will afford a sufficient degree of illumination about the room. In fact, such shaded and centralised illumination is of very pleasant character, familiar enough in many stage settings of studio and dining-room scenes. In workrooms, on the other hand, economy in current cannot be usefully effected by a reduction of illumination if the work is to be properly done, unless, of course, there has previously been extravagance in the volume and intensity of light. Here practicable measures of economy will be in the direction of strict switching off of the light when not in use. An unoccupied room in which electric light is burning needs to be branded as an offence against the public good. Very often in workrooms there is the excuse for such waste in the fact that the switch is so placed that a special to-and-fro journey has to be made to it by an assistant who for a minute or two is working in a room lying in the other direction. But the remedy is easily applied—namely, by severing one element of the double cable which leads to the light, joining one pair of ends of a length of duplex cable to the ends thus made and the other to a switch placed conveniently in the line of route. It is in such directions as these, rather than in reducing the actual light in workrooms that economies are best effected. Neither in dark-rooms nor in connection with working-up or mounting is it to be expected that assistants can do their work properly in a miserable light. But there is plenty of evidence that a substantial decrease in current consumption can be realised simply by taking steps to confine the burning of lamps to the time when they are really rendering service.

What has been said above applies in a measure to gas illumination by incandescent mantles. In a measure—since the actuation of a by-pass is a less handy operation than that of an electric switch. Still it may often be done in cases where hitherto it has been neglected, to which end the provision of longer chains or cords to the by-pass lever is an advisable measure as overcoming the excuse that the burner is not within convenient reach. Here we may repeat the advice to scrap at once any burners of the bat's-wing. open-flame type which may happen still to be in use, even in places where they are used only occasionally. Every little tells, and under a strict scheme of gas rationing, the total cubic feet consumed in the course of a year will be substantially affected by the difference between the six or seven cubic feet per hour—which is that of the open-flame burner and the 2½ feet which is all that is consumed by a bijou incandescent burner yielding two or three times as much light. Gas fires employed for heating rooms, if of old pattern, may easily be an impossibly extravagant source of warmth in the present circumstances, raising the question whether it will not be necessary to replace them by a modern type, if it can be got, an open fireplace of the well or barless kind (or a fitment which supplies its equivalent), or a closed combustion stove. Leaving the two latter out of consideration for a moment, it may be recalled in regard to the gas fire that as soon as the temperature of the room has been brought from cold to a comfortable degree, the burners can be lowered and the temperature maintained at the lesser consumption. Many modern patterns of gas fire embody means for cutting out a certain number of burners for this purpose. But, generally speaking, and with regard to the circumstances created by the Order, it will be found advisable to dispense with gas fires in heating rooms which are in regular occupation.

And this brings us to the use of solid fuel for heating, in regard to which it is to be noted that the Order rates ordinary coal and anthracite equally—*i.e.*, weight for weight. This concession to anthracite, which is a fuel of heating value considerably greater than ordinary coal, may well be emphasised, since it affords a means of economising fuel, whilst the householder will not spend more money, if as much, by using anthracite at its present enhanced price of about 60s. per ton in comparison with coal at, say, 40s. The use of anthracite as an economical source of warmth was the subject of some notes in these columns in the early part of last year, some of which will bear repetition, since satisfaction in this system of heating depends on the observance of one or two precautions at the outset. The first of these is to select a stove of ample size for the room. It will not be any the less economical because it is not used at its full power; in fact, it will be more economical for the reason that it will last longer, while the larger heating surface of a lower temperature will yield a more comfortable heat and one free from the slight but disagreeable odour—or, scarcely that, say sensation—of burnt metal in the room. Moreover, with a stove of ample size there is no fear of the nuisance of its burning out when left to itself damped down during the night. It is scarcely necessary to particularise makers or sellers of stoves, but we may mention two of whom we have had satisfactory experience—Messrs. Smith and Wellstood, of Ludgate Circus, and the London Warming and Ventilating Co., Newman Street. Whatever pattern or size of stove is chosen, a most essential point is that the flue pipe from it should make an airtight joint with the fireplace chimney by means of a sheet-iron plate, cemented in the fireplace opening. When this plate is fitted care should be given to see that it is provided with a small aperture, about 4 by 4 ins., which can be closed by a sliding door, also sheet-iron. This accessory serves to diminish the draught through the stove and is useful in providing a means for obviating excessive chimney draw, such as is liable to be met with when a stove is fitted on the ground floor of a tall building. In some circumstances it may be necessary to keep it constantly open; in others it is needed only when the stove is required to burn at the lowest degree of combustion, for example, during the night. In districts where anthracite is readily obtainable, we regard the use of this fuel either alone or mixed with coke as one of the best solutions of the warmth problem under the present rationing scheme.

Photographs of an Aeroplane.—Marinus de Keyser, 28, a Dutch subject employed at an aeroplane factory, and living at Thorpebank Road, Shepherd's Bush, was remanded at West London last week, charged under D.O.R.A. with photographing military work—an aeroplane—without the permission of the naval or military authorities.

He was further charged with having in his possession two photographs calculated to be directly useful to the enemy.

Detective-Sergeant Parsons said that on August 27 he was called to the factory where defendant was employed, and was told that defendant had been found photographing two men standing beside an aeroplane.

Witness went to defendant's address, and there took possession of two photographic plates of the fuselage of an aeroplane.

Mr. Mead, the magistrate, pointed out that under the Regulation the word "work" obviously applied to a place where military or naval work was carried on, and not to the manufactured article.

"Is there a regulation against photographing an aeroplane?" he asked.

Witness: The competent military authority, I understand, takes the view that this Regulation refers to such a prohibition.

Mr. Mead: I do not read it so. It seems that you must not photograph a place where, for example, shells are being made, but you may photograph a shell.

Mr. O. Hanson, defending, said that in any case these photographs could not be of use to the enemy, as the machine was one of an old type which had fallen behind the enemy lines and had been dissected by the enemy.

THE MECHANISM OF DEVELOPMENT OF THE IMAGE IN A DRY PLATE NEGATIVE.

(A paper read before the Royal Photographic Society.)

Most of the observations, experiments and conclusions which I propose to submit were made and arrived at between the years 1892 and 1901, when I was at work in the Kodak Factory, Wealdstone. Any claim they may have had to originality has long since disappeared. If, therefore, I ask for your kind indulgence it can only be on the plea that though the subject is no longer new, it is still far from having reached finality. Independent observations are of use in that they help one to judge of the value of observations made by others, and here and there they help to clear up points. Also the conclusions at which I arrived as time has gone on have helped me in my work and may help others.

In 1892 I first started the study of the Hurter and Driffield method of speed determinations. One of the facts that struck me after I had been working at the method for a while was, that with the sensitive transparent Kodak films I was testing, the inertias for different development factors were not constant, as had at that time been stated to be the fact by Messrs. Hurter and Driffield, even when I used an unrestrained pyro soda developer. At first I had not sufficient confidence in my apparatus and in my methods of testing to feel sure that this observation was correct.

In 1896 I had occasion to study microscopically the mechanism of development in photographic films when trying to disprove a theory of "reversal" which R. E. Liesegang had put forward. The results I obtained, and subsequent work carried out with the assistance of Mr. E. and Mr. L. Robins, using more perfect apparatus, confirmed me in the conclusion that probably all dry plates show this variable inertia with varying development factors to a greater or less extent; but that in most cases the variation is small enough to be almost negligible within the range of useful development factors. I hope to be able to show you why this must be so, *i.e.*, why for a dry plate the inertia is not constant for all development factors.

Pieces of Eastman transparent film were exposed to daylight behind a strip sensitometer, the densities of which were selected in such a way that after exposure portions of the film were under-exposed, portions fully exposed and portions well over-exposed. Development was carried out with unrestrained normal ferrous oxalate developer. After development the films were treated with an alum solution acidified with sulphuric acid, washed and fixed. The films were developed for shorter or longer periods, and, when dry, sections were cut and examined under the microscope, after covering them with a slip and moistening them with water so as to swell the gelatine.

By employing transparent negative film one secures a great advantage, for with this film it is not difficult to cut slightly wedge-shaped sections with a razor (Fig. 1) so that at the thinner portion the nature and character of the silver deposit in the gelatine can be easily studied. Since the support and emulsion are side by side, errors as to top and bottom of the sensitive emulsion layer are easily avoided.

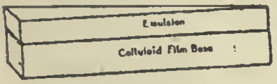


Fig. 1.

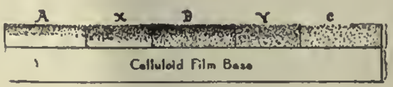


Fig. 2.

The first point of importance to note is that the nature of the deposit varies according to the length of time of development. This is very noticeable in those cases where a portion of the film has been sufficiently exposed to produce reversal or solarisation. As a matter of fact, "reversal" is hardly a correct term if the term is used to mean that the silver haloid in those portions of the film has acquired the property of resisting development *entirely*, or *almost entirely*. If development is but continued long enough, with unrestrained, or *slightly* restrained developer, the solarised portions appear finally to become as opaque as the most fully but correctly exposed portions of the film.

I propose, for the sake of simplicity, to describe a type case, or one which summarises my observations.

Suppose, then, we have exposed five portions of our rapid Film (Fig. 2) in such a way that the *first exposure* (A) falls well within the period of under-exposure; the *third exposure* (B) falls well within the period of correct exposure; and the *fifth* (C) falls well within the period of reversal or solarisation; the *second* (X) and *fourth* (Y) being portions lying between (A) and (B) and (B) and (C) respectively. On developing such a film for a short time—say for *not more than* three to four minutes—and on cutting sections of the dried film, the following kinds of silver deposit will be observed:—

Section (*A.*)—Close to the upper surface, a thin layer of fairly coarse-grained black silver particles will be seen; a little further in, these particles are fewer and further apart; and close to the film lies a layer of clear gelatine.

Section (*B.*)—Here close to the surface of the film will be found a dense and fairly coarse-grained layer of black silver particles. This layer extends some distance down, but gradually gets more fine-grained and less dense, and finally gives way to a layer close to the celluloid support, not of clear gelatine, but of gelatine containing a great number of *very* fine particles, which give to this layer a slightly reddish-brown tint (occasionally a bluish tint) when any but a very thin section is examined under the microscope.

Section (*C.*)—Here finally a very thin surface layer (this thin surface layer may, however, be absent) of fairly coarse particles rapidly gives way to a grey uniform layer which extends from top to bottom of the film, made up of innumerable medium-sized or coarse particles of silver.

On examining the above film negative by reflected light, it will be noticed that the surfaces of (A) and (B) have a greyish silvery appearance, but (B) more so than (A). By comparison (C) looks dark. (A) and (B) will be seen to have a matt surface (B) more so than (A), but (C) will be quite glossy.

From the observations on film sections just recorded the explanation is obvious.

On examining the negative from the *back* by reflected light, against a black background, we find that (A) looks black by contrast with (B) and (C). (B), however, shows a greenish white colour. (C) is less black than (A), but decidedly blacker than (B). Here again the observations on film sections give the obvious explanation.

The milky tint in (B) is, of course, due to the very fine red deposit close to the support surface. This deposit, which is red by transmitted light, shows the complementary colour (a milky-white green) by reflected light.

If development in the above typical experiment had been shorter even than there mentioned, we should have found that the surfaces of (A) and (B) would be much less rough, and examined from the back, the deposits would all look milky, but (A) least so.

If development is very much prolonged, we gradually find (B) and (C) approaching each other in dulness of surface. By transmitted light (C), however, retains its character of a pigment to a certain extent as the particles are finer grained, or at least more uniform in grain. The difference at the back, too, then becomes less marked, the greenish-white changing to a grey-black; for the particles get coarser, and the fine red particles especially grow into coarser grey particles. (A) then finally looks blacker than (B) and (C) by contrast.

It is interesting to note that (C) is edged by a border of halation which shows the characteristics in a short space which (A) and (B) show for a larger area, *i.e.*, the reversed part is edged by a white rim and this by a black rim. With prolonged development the area of (C) and the edging fuse into a uniform grey shade.

With the above facts in mind, it is now possible to attempt an *explanation* of the mechanism of development of the image in an exposed dry plate, and we shall then see in how far further experiments enable us to confirm or reject the explanation.

When the developer is flowed on to the film, it does not take very long to permeate the entire film, but it must not be assumed that it saturates the film, and then comes to rest there; there must be a constant diffusion of the developer from the top into the lower layers, and *vice versa*.

Now consider a portion like (A). Here the light has only acted on the emulsion to a *slight* extent, and the particles have only been *slightly* affected at the surface; further in they have been still less affected owing to the upper layers of silver haloids cutting off light. It takes some time, therefore, for the developer to commence the reduction of the particles, but when it does commence to do so, the number of light-affected particles reduced is not so large as to seriously affect the developer.

The silver haloid particles in the film, both in the surface layer and the deep-seated layers, are being acted upon all the time by a fairly strong and barely restrained developer. The result, therefore, is that *once* development of each particle has commenced it gets *quickly* reduced to the black form of silver.

Next consider section (B). Here the particles of silver haloid have been acted upon strongly enough by the light to be easily reduced, especially at the surface, and even the most deeply seated layers will have got sufficiently illuminated for a large number of the particles to become reducible. On flowing the developer on, we find that very soon after it has penetrated the film reduction of the layers nearest the surface commences rapidly, and in consequence a very considerable weakening and restraining of the developer takes place in this part of the film.

Close to the surface, of course, this weakened and restrained developer quickly mixes with, and is soon replaced by, fresh developer diffusing into the film. In the lower layers, however, it takes much longer for the developer to be replaced by fresh developer, and moreover, for some time the fresh developer which penetrates to these lower layers must be mixed with spent and heavily restrained developer. The development in these lower layers, therefore, is started and carried on for a time with weakened and heavily restrained developer.

Now a reducible silver haloid, when acted upon by a weak and heavily restrained developer, only gets reduced slowly. The first form to which the silver of the particles is reduced is the red or fine-grained form of silver. When using a restrained developer I believe every particle goes through this phase, but it does so rapidly or slowly according to circumstances. The change is rapid if the developer is strong and especially if it is not very heavily restrained. The change is slow if the developer is weak and especially if it is heavily restrained. The red particles mentioned above are thus accounted for.

In (Y), unless development is very short, we get the lower layers showing less red, or no red at all, because although the developer is heavily restrained in them, they have been more fully exposed and development, therefore, progresses more rapidly than in (B).

In (A) and (X) the few particles in the lower layers are grey, even after a comparatively short development, because although they have been less illuminated and are therefore less amenable to development, they are acted upon by a comparatively unrestrained developer.

We now come to the vexed question of the mechanism of development in the fully reversed part (C).

Take into consideration the hypothesis that the *developer* is so heavily restrained by the light-liberated haloid, that, in the reversed parts, development can only proceed with difficulty. At first sight this seems a correct and sufficient explanation in view of the fact that with long development the reversed parts can be fully developed.

A film was given various exposures. (Where printing out *just* became visible, reversal began.) Sections were developed for varying lengths of time with a very heavily restrained developer. They were then alumed and fixed as usual. The reversed parts, when development had proceeded for an hour, were still reversed as compared with the fully exposed parts. The image was thin throughout, and was red. When developed for two and a half hours it was blue.

Now one would think that with a very heavy addition of bromide to the developer, a little extra restraint in the film, owing to decomposition, should be negligible; and one would expect the reversed parts to develop up at least as densely as the fully but correctly exposed parts. The fact that a different result was obtained leads to the conclusion that, though restraint of the developer is probably a *real* cause, it is not the chief cause of reversal.

Two of the possible additional causes I will briefly describe.

First, if a film is printed out so that if developed it would show reversal, and is then fixed, a red image is obtained.

Examined under the microscope sections show that there is a fine precipitate in the gelatine from top to bottom, slightly denser in the top than the bottom (more so relatively than when the film is developed). These particles look like shells round the original haloid particles. Owing to the difficulty of the observation I have little faith in its reliability, still it seems possible and even probable that shells of light-reduced silver do form round all the particles and thus offer a temporary physical restraint to development. Further, the halogen liberated by light-action probably forms a restraining sphere with the gelatine in the immediate surrounding of each silver haloid particle.

Secondly, I have observed that as the result of very long development, with new developers, red fog is occasionally formed in the gelatine, but not in the immediate vicinity of the black silver deposit.

Does not this indicate that the developer partly dissolves the silver haloid particles, especially the finest and least sensitive, and thus becomes a physical developer; which then, during prolonged development, deposits fine reduced silver in the gelatine in the form of red fog? The larger silver particles in the gelatine, however, act as nuclei on which the fine reduced silver is precipitated, thus making them coarser and preventing the formation of red fog in their immediate neighbourhood.

Now it seems probable that once the finest particles of silver haloid have been attacked by prolonged exposure to light and have thus been reduced on the surface, they get protected against the developer and become less amenable to solution, especially if a sphere of gelatine haloid surrounds them. They are, therefore, both difficult to reduce, and are not easily dissolved, and cannot help to build up the coarse particles by physical development.

I do not think it is too much to say that the coloured grains above described are Carey Lea's grey, red and blue silver obtained from photosalts prepared by reduction.

The observations I have just described, and the conclusions they lead to, help to explain some of the peculiarities exhibited by the characteristic curves of plates in the course of development.

For the following experiment two sets of strips from two films were exposed to a 10-candle standard pentane lamp, and then developed for various lengths of time at 65 degs. F. with an *unrestrained* pyro soda developer, of about half the strength of the H. and D. standard

On completing the time of development for each strip, it was at once removed and put straight into a hypo-alum bath in which it was rapidly fixed, keeping the strip moving about all the time.

The times of development of the ten strips were:—

¾, 1, 1½, 2, 3, 4, 6, 8, 12, and 16 minutes.

F. W. T. Krohn.

(*To be concluded.*)

◆

Manchester Classes in Photography and Process.—The prospectus of the part-time classes in photography and photo-mechanical processes in the Manchester College of Technology is now obtainable, and should be studied by all those who are able to take advantage of the courses of instruction offered at very low fees.

A new class this session is one for "Wet Collodion—Continuous-Tone Negative Making." This class will be under the direction of Mr. F. G. Curson, the manager of Photographic and Engraving Departments of Messrs. Hultons, and president of the Manchester Amateur Photographic Society. It is intended primarily for professional photographers, and should meet a very pressing need. Most copying and enlarged negative making may be done extremely well by the wet collodion process, but the majority of professional photographers at the present time have not had the opportunity of gaining practical experience in the process. The substitution of wet collodion for dry plates at present prices will represent a very considerable economy. Last session the classes in portraiture and in retouching under Mr. Longworth Cooper, a successful and original worker, were particularly successful, and they will be resumed this session on similar lines. The Acting Principal, Mr. R. B. Fishenden, is devoting special attention to machine gravure, and it is hoped that an increasing number of workers who are capable of, and are prepared to undertake, investigations in the many problems in the various sections of the work will associate themselves with the college.

PLATES.

(From Rajar "Trade Notes").

As most photographers are aware, it is necessary to return used plates to the extent of 75 per cent. of their order for new stock, and it therefore behoves our friends to take precautionary measures to economise and to make such arrangements as will prevent dislocation of business, as the glass shortage will probably continue for some time.

Many photographers have already disposed of the bulk of their old negatives, and consequently have no reserve to meet the question of re-orders. To make a glass transparency from every approved negative is out of the question, but it is an easy matter to make a special filing print suitable for copying.

Reproductions from prints are considered by some to be much inferior to those produced from transparencies, and to be lacking in detail and quality; but in our opinion the secret of success lies in the production of the right kind of print for copying. A brilliant print that may be sent out to the customer in execution of an order is not suitable for copying, and we would suggest that a special print on glossy bromide paper or card be made from every approved negative and filed in the same way as the negative.

This print must be well exposed, in fact, a trifle over-exposed, and developed with a somewhat dilute developer, the object being to get full detail in the highest lights whilst still retaining the shadow detail, with only a certain amount of contrast. The resulting colour may be greenish, and the print may appear to be lacking in good contrast; but it must be borne in mind that in copying it is an easy matter to obtain increased contrast.

In copying, the most regular results are obtained by lighting the print with artificial light, and our friends who have no permanent device would do well to make one at once. Two lamps, one each side of the copy, in half-circle white matt surface reflectors, which prevent the source of light from reaching the lens, make an excellent apparatus, and a few tests can be made to ascertain the exact exposure required to produce the class of negative used. This exposure would, of course, vary if the prints were copied at different foci, but the greater bulk of the work would be straightforward.

The copy negative may require to be retouched slightly, but some workers will get better results by printing their filing prints from the negative before retouching, and subsequently retouching the copy negative. In our opinion this is the better way, and, if the copying is carefully done from the right kind of print, the results will not be inferior to the original in the eye of the customer.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Cutting Dry Plates.

For some time to come the present high price of glass plates is likely to continue. The supply is also conditional, and these conditions may become even more onerous. It is quite possible that the supply in the near future may not equal the demand

The professional himself can help in several ways. One way is to use smaller plates, and enlarge. Another, is to use up the stocks of old plates. In both cases it is often necessary to cut each plate into two, or more, smaller ones; or to cut off the edges of stale plates, and reduce them to a standard size for use.

When cutting plates in the dark room several difficulties are met with. The cut plates must be accurate sizes. The emulsion itself must not be touched, or finger marks will inevitably show in the final result.

Grit and dust, mostly in the shape of fine particles of glass, must not be allowed to get between the emulsion and the cutting board, etc. The tools used must be efficient, simple and hardy, as the plates must be exposed as little as possible to the dark-room light. And lastly the plates must be repacked so that the powdered glass from the new cut does not get between the plates. Tiny fragments adhere to the broken edges of the emulsion unless the cut is a very clean one.

The writer has cut up a large number of plates, and the following description of the method evolved, after numerous failures, will be helpful, at all events to the novice. A good diamond is necessary. It does not pay to use the wheel substitutes. A flat cutting board should be procured. A small drawing board, or even a domestic pastry board, is very suitable. A strip of any simple moulding, with a perfectly straight edge, should be nailed or screwed near to, and the full length of, one of the edges of the board. The size does not greatly matter, so long as it is big enough for the largest plates likely to require cutting.

A cutting shape should be made for each size of plate required. A piece of 3-ply wood answers admirably. One edge should be perfectly straight, and the other should have a small screw inserted edgewise near each end. If the piece of wood is cut ¼ inch less than size required, and the screws project say a little over ⅛ inch, the cut of the diamond will be about the right place, but exact adjustment may be secured by means of the screws after a few trials on a piece of old glass. By having a piece of wood for each dimension, accuracy is ensured. Of course there are ingenious contrivances for adjustable shapes; but nothing so easily made, and accurate and reliable, has been seen by the writer. Bore a small hole in each cutting plate, and keep them hung up. Nothing more is needed in the way of apparatus.

When cutting the plates keep away from the safe-light. As each plate is dealt with put it in the shade or, better, in a drawer under the cutting table. Take two plates and see that they are film to film as originally packed, but with no separator between. This enables them to be freely handled. Lay both the plates on the cutting board, put the shape on top of the plates, with the two screws butting against the straight edge, as of course also are the plates. Now, make the cut. A little practice on old negatives will soon show the best angle at which your diamond cuts. Turn the plates over, still film to film, and cut the other plate.

Now separate the two plates, and break them along the cut, without breaking the film. Fold up each plate in halves, film to film again, and leave them so, *and unbroken*, until ready to load them into slides, or until they are cut, if required to a still smaller size. This allows free handling after cutting, prevents the films from rubbing against each other, and keeps the newly cut edge, with its danger of powdered glass, sealed off from getting between the two plates.

Some of our plate-makers now pack their plates in this way and the rest ought to do so. The separating strips of paper used by most of them usually affect the emulsion within six months or so; and, the plates not touching, the edges soon go all round. The writer's experience is that this method is about the worst possible way of packing plates, with a view to their reaching a healthy old age. Face to face, in actual contact, with film unbroken to prevent rubbing, is the best. If our plate-makers would occasionally buy and use a box of their few years old brand from the village chemist they would learn something.

The writer regrets to record that his experience is that foreign plates are as a rule better packed than English plates—hard impermeable black paper, and double outer waxed paper for each four plates, in the one case; small pieces of common thin brown paper—three bits in a box of twelve plates—barely big enough to cover the four plates, in the other case. There are rare exceptions some of our makers *do* pack their plates conscienciously.—J. C.

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Hon. Secretary, 5a, Pall Mall East, S.W.

October 14 to November 30.—Royal Photographic Society. Entries close (carrier) September 20; (hand) September 21. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

Royal Photographic Society Exhibition.—A number of entry forms sent to past exhibitors have been returned to the society marked "gone away." As the secretary points out, war conditions have no doubt caused many removals, and non-receipt of a form should not be regarded as due to any lack of courtesy on the part of the society. As entries close on September 20 for photographs sent by carrier, and on the 21st for those delivered by hand, it would be well for intending exhibitors to apply for entry forms as soon as possible.

Patent News.

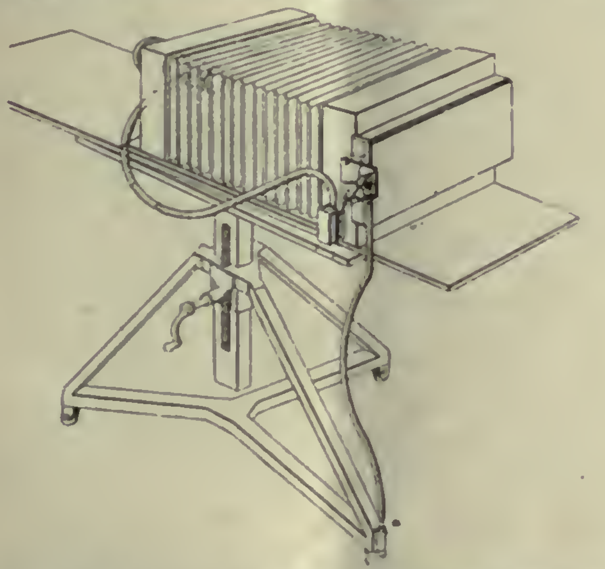
COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

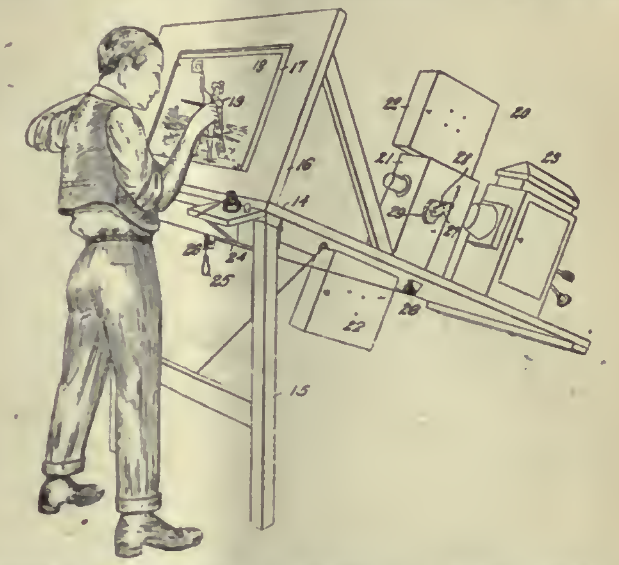
Living Portrait Camera.—No. 117,342. (Sept. 14, 1917.) The invention relates to a camera for the making of two-part or three-part sectionised photographs by exposure of a plate behind a ruled screen. The essential feature of the invention is the making of the complete series of photographs at one exposure by moving the camera around the arc of a circle, and, in correspondence with this movement, moving the plate in reference to the ruled screen. It is preferred to move the camera through about 60° and to make the pitch of the screw and the gearing such that during this movement of 60° the plate will be shifted preferably slightly less than the width of one of the areas above referred to. Movement of the camera may be produced by a motor driven at various speeds as desired.

The drawing represents the gearing devices for moving the sensitive plate the necessary minute distance and also for effecting the opening and closing of the lens shutter.



The screen used in this process may be an ordinary line screen or it may be made up of parallel cylindrical lenses, the preferred construction being a new line screen which is a combination of the two, in which the screen has the parallel cylindrical lenses, which the opaque lines overlap and with which they alternate, thus screening off the less efficient parts of the lenses and thereby focussing the light to sharper lines on the plate, a point of advantage over the lenses alone.—Clarence Whitney Kanolt, 3111, Rose Place, Washington.

Cartoon Cinematograph Films.—No. 117,839. (July 30, 1917.) —A film specially taken or any suitable film is taken, and the pictures on the film projected, one by one, in proper succession, by a suitable apparatus, preferably arranged as in the drawing, in which an inclined platform is shown, supported by suitable legs. A frame or easel at the upper end of the platform carries a transparent support (glass plate) upon which is placed translucent material, say a sheet of suitable tracing paper, on which the artist traces (preferably with pen and ink) the lines of each picture, or such elements thereof as he wishes to utilise, altering other features as his fancy may dictate, and thus producing pictures which in pose and certain general features correspond to the film pictures, but differ therefrom in other particulars so as to produce the cartoon effect. A projecting apparatus is employed, which part of the device includes a suitable projecting machine. It will be understood that each picture remains projected on the sheet until the artist has completed his tracing, then the sheet with the tracing is removed, another (blank) sheet is substituted, the film is fed to project on the blank sheet the next picture to be traced, and the tracing or drawing operation is repeated for this new picture. In some cases a continuous web might be used, preferably passing from one roller to another. Jacob Frank Leventhal and Max Fleischer, 23, East 26th Street, Manhattan, New York.



Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, September 14.

Hackney Photographic Society. Outing to Chingford.

Tuesday, September 17.

Hackney Photographic Society. Monthly Competition.
Manchester Amateur Photographic Society. Exhibition of Prints. F. M. Duncan.

Wednesday, September 18.

North Middlesex Photographic Society. Improving Prints for Exhibition.

Thursday, September 19.

Hammersmith Hampton House Photographic Society. "The Humour and Pathos of London Streets." A. H. Blake, M.A.

CROYDON CAMERA CLUB.

If only members could carry into practice all the varied crafts from time to time shown in the informal sessions there would be handy men about the house with a vengeance. But rumour has it that certain ardent souls, inspired by such utilitarian mechanical minds as Mr. W. H. Smith and Mr. B. J. Rose, without previous rehearsal have recklessly attempted to emulate their exploits at home, with results that seriously tended to diminish the dignity of the head of the house, an elevation of aspect at the best of measurable height in the eyes of the most devoted spouse. For instance, the guardian of the refreshment department, Mr. H. C. Triskeep, seeing one evening Mr. Smith soldering, came to the conclusion that the procedure was easier than falling off a log, and remembering a shilling kettle at home with a small hole in its crumbling bottom, he forthwith purchased a soldering outfit. By the time he had finished wrestling with that hole it was enlarged to ten times its area, another of appreciable dimensions was presented to the dining-room carpet, and an inquiring nose of a favourite cat retired fully informed as to temperature—since when, soldering has been abandoned for other pursuits.

Last week Mr. Hugh Allen, an ex-member of many accomplishments, gave a very practical demonstration on boot repairing, and the apparent simplicity of the operations opened out vistas of war-time economies. What more delightful for a wife one Sunday morning after return from church and prayers for a "new hat frame of mind" in her husband to find a multiple-laced, stilt-substitute heeled pair of boots repaired in truly sensible fashion, with a masculine regard for utility rather than mere elegance. Such a surprise should do much to modify the snappishness which a long service and interval between breakfast and dinner are apt to engender. It is therefore unfortunate that Mr. Allen's demonstration could only be adequately dealt in a space not at command. Evidently it took with the members, and no material harm should result, provided, of course, that those all "fingers and thumbs" do not carry their repairs to such a pitch as to make impossible subsequent rectification by the professional. It may here be remarked that although not referring to actual repairs, a recent official advertisement deals with "How to Save on Boots and Shoes," and may profitably be consulted by those of extremely limited intelligence.

Since photographers must be shod, and well shod if they wish to emphasise their feelings on any chance meeting with a dry-plate manufacturer, a few practical points considered may be alluded to. Among these may be noted the general agreement as to the advantages and good wearing properties of the various rubber preparations on the market for soleing and heeling, particularly for the latter. Mr. Allen strongly recommended "Economite," and pointed out that useful stuff of all kinds might be picked up cheaply at Farringdon Market. Mr. Harpur was much impressed with the demonstration, and intimated he meant to have a cut at repairs, starting on the boots of the "missus." Many of his friends had used with satisfaction the outer covers of old motor tyres. Mr. Walker had found the "match-stick stunt" very good, whatever that may be, and showed rubber soles to his boots with a central uncovered patch. Mr. Reynolds said he had tried these, but in his hands, or rather on his feet, they acted as suckers, backfiring heavily on contact being broken with the pavement. It transpired that Mr. Sellors had not tried boot repairs, but he showed such an extensive knowledge of ladies' boots as to indicate more than the usual appreciation of the married man for well-turned ankles in the fair sex. Mr. Bennett said that he had walked over 1,200 miles on one pair of "Phillip's army soles," and advocated the employment of neatsfoot oil for preserving leather. Mr. Dodsworth preferred boiled linseed oil for the soles, but said the prepared "Dryshod" leather lasted well. Mr. Salt said a frequent and *sparing* application of neatsfoot oil to box-calf uppers doubled their life. It removed the old Nugget, retarded cracking, and did not prevent a subsequent shine. Useful, also, for leather camera cases and such like. Personally, he had found "Dri-ped" soles satisfactory, but heels made of this material grew whiskers. On smooth pavements he experienced a tendency to slip about, "even when perfectly sober," he added, to forestall an obvious witticism. "Which shows the danger of venturing out when in an abnormal condition," gravely remarked Mr. I'Anson, leaving nothing more to be said. A most hearty vote of thanks was accorded Mr. Allen for a most useful and amusing evening.

News and Notes.

ENEMY ALIENS.—In the latest list of enemy aliens to be interned is C. H. Dierks, Glasgow; age, 50; twenty-eight years' residence; German wife and one British-born child; photographer.

ACID-FIXING WITHOUT ACETIC ACID.—The following bath is recommended by "Studio Light," the professional monthly issued in the United States by the Eastman Kodak Company for fixing prints:—Water, 64 ozs., hypo, 16 oz. When dissolved, add the following solution:—Chrome alum, 100 grs.; soda bisulphite, 1 oz.; water, 5 ozs.

DRY MOUNTING FOR THE TRADE.—With the present shortage of working staffs, and the inability to procure mounting appliances, it may be worthy of note that photographers can send their prints and mounts to the Victor Co., of Pickering Street, London, N.1, either by post or messenger, and have the dry-mounting done without delay. The Victor Co. have added this new department to supply the needs of a number of under-staffed photographers, and the project should appeal to many, especially as all orders are despatched by return of post, or the work done in a few minutes whilst a messenger waits. The company will also be pleased to send a testing sample of their dry-mounting tissue on application.

HAMMERSMITH HAMPSHIRE HOUSE PHOTOGRAPHIC SOCIETY.—The society commenced its new session on September 12, and the programme for 1918-1919 promises a series of interesting evenings. There are still vacancies for new members, who will be heartily welcomed on any Thursday evening at eight o'clock at Hampshire House, Hog Lane, Hammersmith.

METHYLATED SPIRIT SUBSTITUTE.—Those who find a difficulty in obtaining methylated spirit for such purposes as heating the vaporising chambers of wickless paraffin stoves will be glad to hear of a liquid which can be readily obtained for the same purpose. This is "Flammogene," supplied by Messrs. Archibald Vickers, Ltd., 28, King Street, Covent Garden, London, W.C.2, at the rate of 25s. per gallon. A sample is sent on receipt of a postal order for 1s.

DEFENCE OF THE REALM.—At the Boston Borough Police Court, before Mr. W. Pooles (in the chair) and other magistrates, Tom Marson, 1, Adventure Place, Hanley, school teacher, was summoned for having in his possession a photographic apparatus without having obtained the permission of the Competent Military Authority (Defence of the Realm Regulations). on August 14.

Defendant pleaded guilty.

Police-Constable Walker stated that he was on duty on the Haven Bank, when he saw the defendant fixing up his camera on his tripod, apparently with the object of taking a photograph of the "Stump." Witness asked him whether he had a permit, and he replied that he had not, and did not know that he required one. He added that he purchased his camera in London, and he thought they should have told him about the Order. At witness's request the defendant packed up his camera and accompanied him to the police station. He stated that he had come from Sleaford that morning.

The Magistrates' Clerk (Lieutenant E. Waite): He did it quite openly?—Yes, sir.

The Chairman: Were you down here holidaying?

Defendant: Yes, sir.

Defendant stated that he was absolutely ignorant concerning the regulations forbidding the use of a camera in Boston. He was acting quite openly on the river bank, and there was no criminal intent. If he had committed an offence it was a technical one through ignorance. He was in full view of everyone who was passing, and he had no intention to deceive.

The Magistrates' Clerk: Have you been in the habit of using a camera long?—I bought it on August 1, and I have not taken one photograph with it. I have used a hand camera before.

The Magistrates' Clerk: It is very careless of you not to know this regulation.

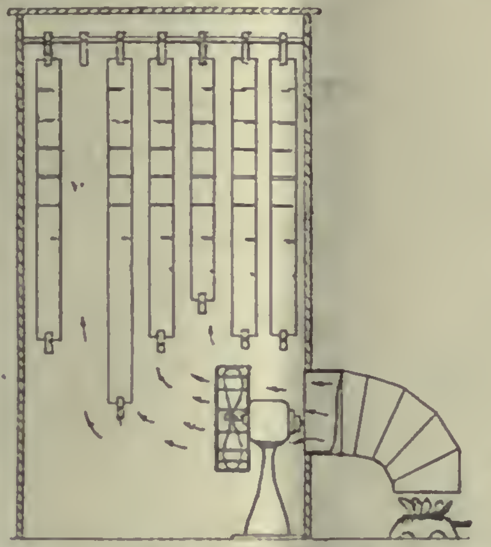
The Chief Constable: These regulations have been about a long time, and they ought to be known by now.

The Chairman: As a schoolmaster, you ought to have known of this regulation, but as you were on your holidays we take a lenient view of the case, and you will only be fined 10s.

DRYING FILMS.—A booklet on the development and finishing of films, issued by the Northern Photo Supply Co., Minneapolis, gives the following advice on drying:—

In drying films, too high a temperature is dangerous, as it may result in the emulsion becoming soft and running, and films so dried are inclined to be other than smooth and flat, causing inconvenience in printing, not to mention their untidy appearance. Dry, warm air, kept in circulation, best serves the purpose. There are a number of satisfactory arrangements that can be employed, but we use and recommend one such, as is shown in the illustration herewith. This consists of a chamber or small room easily constructed of Compo board, the size and dimensions depending upon the work to be done and the space available. Along the top, which is provided with several narrow openings to permit air to escape, are fixed strips or cross bars fitted with metal pegs or clips, from which the films are suspended. If, in place of the bars, a buggy wheel or a like circular arrangement be installed by being suspended on a rod through its centre so that it rotates easily, any individual film can be detached and removed without disturbing the others. In addition, it is much easier to hang up and remove the films by reason of the clips coming successively into reach as the wheel is turned.

At the bottom and just outside the drying chamber is placed a gas or oil heater with one opening of a large galvanised iron elbow over it, and the other passing through a hole in the side wall. Just inside this opening is placed a twelve-inch electric fan that draws the dry warm air into the drying chamber, the openings in the top permitting it to escape after it has circulated and become moisture-laden from the films. The amount of air allowed to escape can be regulated by covering up one or more of these openings as thought necessary, and can be covered when the dryer is not in use, to prevent the access of dust.



The illustration herewith shows the construction of a rather small drying chamber, an ordinary gas burner and twelve-inch fan being quite capable of taking care of a somewhat larger drying space.

Society of Master Photographers (Lancashire and District).—At a committee meeting of the society held at Preston on September 3, the following resolution was unanimously passed:—"That a letter be sent to the plate-makers stating that although we are conscious of the difficulty of obtaining raw materials, it is keenly felt by all photographers throughout the country that the present advance in price is unjustifiable, and we protest strongly against the attitude of the makers in trying to compel photographers to accept such a price for their own negatives as the plate-makers decided upon. While we are prepared to help the manufacturers over the difficulty, we are of opinion that the photographers should have been consulted as to the terms offered for the return of their negatives." A further resolution passed was to the effect that "the Society of Master Photographers (Lancashire and District) desire to lodge its protest against the formation of the Manufacturers' Association Combine, and views with alarm the methods adopted by this combine."

Following on the plate discussion, a small sub-committee was appointed to deal with the matter, and to visit the plate-makers with a view to getting some concession.

Mr. Kenworthy dealt very fully with this question, and the meeting was unanimously convinced that these advances and the terms offered were not justified. He said: "One almost gets to the end of one's tether in thinking about remedies for this unfair action, but we must do something." He hoped that each member would come forward with a suggestion, so that the committee would have something to work upon. He appealed for more members, and stated that the society would not rest until every photographer in the county had been enrolled. "As professional photographers we want to be looked up to. The profession is an honourable one, and we want all to realise that 'unity is strength.' Be loyal to each other, and then we shall accomplish our ends."

Mr. Huish then raised the question of the aliens. It was decided to issue a new application form for membership, and on which the nationality of every member must be stated; and it was also decided not to admit aliens, and attention was drawn to No. 7 Rule, which reads as follows:—"Rule No. 7.—Election of Members.—All members of firms, or individuals who are master photographers, and who are now, or have been, engaged in the trade, shall be eligible for membership. But all nominations for membership to the society shall first be submitted to the committee, and, before election, the proposed member must satisfy the committee as to his standing in the profession."

The Hon. Sec. read a letter from Mr. Mackie, Hon. Sec. P.P.A., in which he explained the efforts made on behalf of the profession by Mr. Houghton and himself, and a letter of thanks was requested to be sent to Mr. Mackie for his efforts in this matter. The meeting approved of the action taken, and trusted they would be successful in getting their proposal through.

Twenty-three new members had been enrolled at the committee meeting in the afternoon, and this was considered eminently satisfactory. Another question that was brought up was with reference to the engagement of wounded soldiers to be taught photography. The Pensions Committee have asked photographers for their opinion as to what terms they would offer to teach photography to wounded soldiers. This opened a rather lengthy controversy, and the matter will be more fully discussed at the next meeting.

Mr. Foley suggested that we should endeavour to find out the actual cost of the price of plates, as he was convinced that the plate-makers were profiteering. "We have the future to think about, and an association like this (affiliated to the P.P.A.) should be able to show the plate-makers that they cannot have all their own way without consulting the photographers."

Mr. Kay, the President, at this stage again appealed for all to endeavour to bring the photographers in their towns to join the society. If they would all bring two members, it would be a credit to the society and uphold the dignities of the profession, and advance and protect their interests.

Mr. Huish mentioned that the former plate ring, formed about fifteen years ago, tried to dictate terms, but without success, and he was pleased to know that some sort of protest was now to be made. He said: "The plate-makers should have taken the photographers into consultation. The plate-makers can do without us, but the time will come, and come quickly, after these terrible days are passed, when we can prove we are not competitors but brothers, and will live and let live." The society should be congratulated upon the enormous amount of success that has been achieved in three months. Mr. Huish offered his services voluntarily in any capacity to further the interests of the society. He pointed out that the minutes of the committee as well as the minutes of the general meetings might be read to the general meeting.

The Hon. Sec., in reply, stated that this had been done at the two general meetings, notwithstanding that they were open meetings and all present were not members. This was done to let every photographer know what the committee were doing. The next meeting of the society will be held at Blackburn on Wednesday, October 2. A hearty vote of thanks to the chairman concluded a very successful meeting. All applications for membership should be in the hands of the Hon. Sec., Mr. Fred Read, 14, Balfour Road, Southport, not later than September 30.

Correspondence.

\. *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

\. *We do not undertake responsibility for the opinions expressed by our correspondents.*

ON THE RECOVERY OF SILVER FROM OLD FIXING BATHS.

To the Editors.

Gentlemen,—In my former letter (July 12) I dealt briefly on the matter of hypo recovery. With your permission, I have now much pleasure in sending you the result with regard to the recovery of silver in the following simple manner.

In the first place, I took all my print fixing baths and poured them into a large basin. Then I put a strip of zinc into the solution and left it there for three or four days. The clear solution was filtered and strengthened with fresh crystals of hypo for negatives. The sludge was gathered and dried on blotting-paper. When I weighed my lot it was 21 ozs. This I sent to the Sheffield Smelting

Co., who promptly sent me 16s. 10d. This proves the value of old print and negative fixing baths by the zinc process. Thus you will see that it is a saving both ways, and may be of use to larger firms, who fix thousands of prints for my hundred.—Yours faithfully,

Henry Holman.

A QUESTION OF CHARGES.

To the Editors.

Gentlemen,—In reply to "S. E.'s" query as regards the question of charges, the rule I adopt in cases like this is: I presume my customer will require at least one dozen photographs. For an order of one dozen it is my usual method of sending four proofs (unfinished) to choose from, but sometimes overstep by sending five, and in a case like the one mentioned should send two of the group, two of baby, and one of child. If more than the dozen is ordered I charge at the dozen rate, so, presuming my fees to be the same as "S. E.'s," my charge would be for the fifteen portraits ordered £1 19s. 6d. I always think this is fairest, as the order comes from one purse, not three.—Yours faithfully,

Ernest A. Day.

To the Editors.

Gentlemen,—It would certainly be in order, in fact the only business way, to charge the full price. *Usual* does not apply as amongst photographers in general; there is no *usual* way of charging. Each firm fix their own charges, and what is usual to one is very unusual to another. Unfortunately, there are photographers who have a very "unusual" way of charging, or, rather, not charging for cost of extra material and work done. That is why the man who does charge often hears his customers say, "Oh, but that isn't usual!" and straightway gets the credit of being a robber.

I take it that "S. E." is in the photographic business, and in it for business and not for the fun of the thing, therefore I think he will agree that he should be paid for the material he uses, also for his time and ability. His income is regulated mainly by the sale of his *time* and *ability* (his stock-in-trade). Materials at one time did not count (excepting in very cheap work), but now they have to be seriously reckoned with.

Photographing three individuals from one family entails as much cost and labour as photographing three individuals from different families, therefore why charge less? It may be policy in exceptional cases to pretend to give something for nothing, but there's no doubt about it that it is far wiser and better business to fix prices, and have the courage to take an order or leave it. It will pay best in the long run.

"S. E." raises a question which has probably troubled many a photographer (especially the young ones) at some time. But if they look at it purely from a business point, the answer is obvious. What would a firm of printers say if you obtained a price for a thousand half-tone postcards, and then said, "All right, I'll have 500 each of two subjects?"

The publishers of the *B.J.* charge 1s. for an advertisement of twelve words. I wonder if they would take *two* advertisements of six words each for the same money? I *don't* think!—Yours faithfully,

Through the Mill.

THE ADVANCE IN THE PRICE OF PLATES.

To the Editors.

Gentlemen,—One notices in the pages of the Journal an advertisement which conveys the idea that we, as photographers, are certainly being asked to pay an extortionate price for plates. The advert. states that the cost of coating a postcard plate is ½d. each—the makers' price for this size plate to-day is 6s. 8d., less discount. My discount is 30 per cent., which makes the price, without going into fractions, 4s. 9d., and, deducting the price allowed for the return of one dozen pieces of glass same size, leaves the total amount to pay 4s. 4d. The wide difference between 6d. and 4s. 4d. seems to me one of the war problems that takes some solving.—Yours faithfully,

Ernest A. Day.

To the Editors.

Gentlemen,—"H. C. M." is quite right in believing other photographers have "a very strong feeling against the plate makers," but why does he kick the P.P.A.? Does he think the P.P.A. Council is composed of men with superhuman cleverness capable of smoothing down all the rough places in life for the benefit of the grumbling photographer who neglects to help himself? "H. C. M." is probably as capable of suggesting a means to deal with the trouble as anybody else. I doubt if all the photographers in the country formed one strong association they could do anything to relieve the trouble. Photographers must have plates, and they can only obtain them at the price the plate makers like to charge. There has been much grumbling, but so far I have not seen any practical suggestion as to how the plate makers should be made to reduce their prices.

I take it that "H. C. M." is a member of the P.P.A., and, if so, why does he not air his grievances to the Council direct. They cannot do the impossible, but I am firmly convinced they do all in their power for the benefit of members—not only members, but photographers in general. And for nothing!

In the *B.J*, dated August 23, I notice E. C. Harris asks: "Cannot the P.P.A. do something . . ?" Also "A Country Photographer" asks: "We would like to know what the P.P.A. are doing . . ?" Now, if these two gentlemen are members of the P.P.A., why don't they show the right spirit and write direct to the P.P.A. Council. If not members, how can they expect the association to take notice of their troubles. Personally, there are many things pertaining to the photographic business I should like to see improved. I fear, however, it will be a long time before there is the unity between photographers that there is between manufacturers, and until there is we shall not be able to put up a fight. The only way is to take a leaf out of their book and look for dividends. The plate makers are not going to let dividends down because of the increase in price of raw materials; neither should photographers let down their profits because plates are dearer. Put prices up accordingly, and there'll be no need to grouse. There'll be more need for complaint if the old price-cutting days come back again.—Yours faithfully,

Member of P.P.A.

To the Editors.

Gentlemen,—We have now been over four years at war, and practically every necessity of life and all material of manufacture has increased in price, in some cases enormously: hypo and other chemicals and cardboard, for instance. But recognising that we are at war (the most terrible the world has ever experienced), and that the energies of the contending countries, and indeed most others, are diverted from normal pursuits to the business of destruction, most sane people endeavour to preserve an even balance of mind and to bear philosophically the evils for which there appears to be no remedy available. Others less capable of clear thinking seem to imagine that all their troubles will disappear if *somebody* were to do *something*; or would not have arisen if somebody had done something. As a rule, they can name a somebody, though they do not agree as to the particular agent, but they utterly fail in being able to point out the something.

The red rag of the moment is the rise in the price of plates. Other necessities of the photographic business have been allowed to increase in price—in some cases 900 or more per cent.—with hardly a murmur. The cardboard and chemical manufacturer, etc., are allowed to escape censure on the understanding that the cost of labour, materials, and every other incidental has increased; but the unfortunate plate-makers, although they have obviously the same conditions to contend against, are treated to a constant vituperative eloquence—eloquence that ought to frighten them if anything can. As to the Council of the P.P.A., who are all professional photographers, perhaps it will be some consolation to those whose interests they have basely neglected (that phrase seems to convey the prevailing impression) to remember that they will have to pay the same advanced price for their plates as the victims of their incapacity. Foolish men, thus to sacrifice their own interests to pass their time in undignified repose.

The letters that have appeared in your paper are intensely interesting; some of them not in the sense their writers intended, but as examples of dancing all round the position without realising what the position is. The fundamental fact is that all commodities, including plates, have risen in price. The necessaries of life being necessities must be bought, but outside these those who are not willing to pay the price must go without the commodity. In some cases, it is true, Government has regulated prices; in others, it has made arrangements for the supply of materials for manufacture where they regard the manufacture of national importance. Government, however, has not done anything to help the photographer, and is not likely to except with regard to work for its own purposes. As to the P.P.A. coercing the plate-maker and the mount manufacturer, what would those who suggest this course say if the P.P.A. were to attempt to regulate their prices to their customers? Would they meekly submit, or would they challenge not only its right but its power? It has no such power.

The suggestion of those who propose definite schemes for relief are worthy of respect even if they appear visionary. If they have the courage of their opinions, let them erect their plate factories and institute their distributive associations. Let them join the Labour Union if they please. But those who wail because somebody has not pulled their chestnuts out of the fire deserve nothing but contempt. "A Country Photographer" asks that the P.P.A. should inform photographers generally upon various measures. If he is a member, why does he not write to the proper quarter, instead of to the wide, wide world whence he is not likely to get a reply. "H. C. M." says: "We feel our helplessness to deal with the matter, because once more the whole of the plate-makers seem to have joined the ring." Precisely so. If we are helpless, as he avers, how does his little bleat help us? "A Victim" tells us the market price of glass is 8d. per square foot. He adds, "comment is needless." As the market price of good glass is *not* 8d. per square foot, comment would not appear to be needless. F. Read says: "There is only one remedy: all master photographers throughout the country should form county associations." That is like suggesting that the pill-box is the remedy whatever its contents may be. Pages of false reasoning and wrong deduction with but here and there a gleam of common-sense. It is pitiful that self-interest should so destroy men's sense of proportion. In times gone by, photography was regarded as a profession; we have now arrived, it appears, at a stage of joining hands with "labour." Perhaps if the war ever ends we may reach the dignity of being regarded as petty tradespeople. We seem to be doing all we can to deserve it.—Yours faithfully,

An Old Photographer.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

To the Editors.

Gentlemen,—"H. C. M." is in error if he thinks the P.P.A. were not immediately alive to the necessity of at once moving in the matter of the latest advance in the price and the new conditions of purchase of dry plates.

I am not speaking for the Council, because negotiations are in progress, and conclusions come to will not be placed before that body until its next meeting, Friday, 13th; but I can assure the writer and my brother professionals that not only our deep interest in the welfare of the profession keeps us up to the mark, but self-interest also plays a part, for the totals of our monthly or quarterly accounts are mounting up, and it is to each of us a matter of business to watch closely and, when possible, keep down advancing expenses. With regard to the second paragraph in the letter quoted, by all means let us run an Association with properly paid officials. No doubt, the suitable gentlemen could be found, but (and it is a serious *but*) the profession must pay the piper, which will include rent for offices, salaries, etc., etc., and a well paid man must be at the head. This means an annual outlay of not much short of £1,000. Has "H. C. M." sufficient confidence and knowledge to guarantee more than 500 members at one guinea each? Personally I have my doubts, and believe a large proportion of the present members would drop out. I am sorry to have to say this, but I had the honour of being treasurer for eight years, and I fancy I know something, but should only be too pleased if my unflattering prognostication proved incorrect. Be that as it may, the whole question of progress has been incessantly before the Council, and but for the war, Congress time would have seen the matter on the agenda.

My opinion of the formation of County Associations is, by all means form them and appoint delegates to the parent Association, where I am certain "good men and true" will be very welcome.

I am wondering if there would be anything of an attendance if a special general meeting was arranged. I think it is always well to keep in close touch with the members, and perhaps the time is ripe. What's the view?—Yours faithfully,

Lang Sims.

Brixton, September 9, 1918.

To the Editors.

Gentlemen,—Every professional photographer should read and carefully consider the letter signed "H. C. M." in your last issue. That others than himself have thought on similar lines is evidenced by the "Editorial Notes" appearing in the *P.P.A. Circular* for May, 1918, which, with your permission, I will quote verbatim:—

"Quite a considerable portion of our space is occupied in this number by records of Council Meetings and of the Annual General Meeting. If at first sight this may appear to be dull and formal reading, it should be borne in mind that it is the direct evidence of the continued and increasing amount of work which is being attended to on behalf of the members. The P.P.A. is becoming increasingly useful to its supporters, and it is to be hoped and anticipated that the number of the latter will steadily be increased. It has to be remembered that our Association is conducted and worked by volunteers—men who give up their time and energies to the general welfare of their fellows. It is because of this fact that its affairs are carried through with economy, and, it may fairly be said, efficiency. There are some who believe that the future of the Association lies in the direction of a trade union or limited liability company of some kind, with imposing offices and a paid official always in attendance to receive and talk to members. That, however, would be a very differently organised body to the existing Association, requiring a very much larger annual subscription, and *paid* officers. Whether it would prove more efficient and more beneficial in the end to the members is a matter for discussion upon which it is not proposed to enter just now.

"Photographers, whether members of the Association or not, must not forget that trade associations are the order of the day. The manufacturers of photographic materials and apparatus have an organised body to take care of their interests. Photographic dealers also have a similar body to protect their interests, and professional photographers must not lag behind in this matter."

That the P.P.A. has done, and is doing, good work can hardly be gainsaid; that a stronger and a better P.P.A. could be organised is obvious. Upon whom, then, rests the responsibility of seeing it done? Surely, this responsibility falls upon the general body of professional photographers, who must not rest in the belief that they individually can sleep easy o' nights whilst others look after their trade interests! Especially must this responsibility rest upon men like "A Constant Reader" (page 375), with the parrot cry of "P.P.A. wake up!" and upon "H. C. M.," both of whom seem to appreciate the necessity of action. "H. C. M.," however, relieves the tension by being delightfully inconsequent. In the first paragraph of his letter he writes:—

"At present we feel our *helplessness* (my italics) to deal with the matter, because once more the whole of the plate-makers seem to have joined the ring" (and I may add for his information that Mr. Archer Clarke's Co-op. Works, Ltd., are going to charge "ring" prices). In the second paragraph he writes: "I wonder how many members of the Professional Photographers' Association feel satisfied with the attitude adopted by the P.P.A. as expressed in their 'Grin and bear it' letter published a fortnight ago, and which proves once more that when it comes to the real interests of the profession the P.P.A. is useless." "H. C. M." must be more logical if he desires to help his fellows or the P.P.A.

To conclude, the Council has not been idle nor negligent of their members' interests; they have interviewed plate-makers upon the subject of the rise in prices, and will discuss the facts thus ascertained at their meeting on Friday (13th inst.). What their decision may be I cannot foretell, nor am I authorised to write on their behalf. But I have no hesitation in writing that the arguments used by the plate-makers left me personally entirely unconvinced of the necessity for the last enormous increase in price of plates, and the matter can hardly be left where it is.—Yours faithfully,

S. H. Fry.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

G. K. T.—You cannot do better than wait until Messrs. Hetley and Co. can supply; there is a great shortage of glass of all kinds, and London carbon printers cannot get opal glass for developing upon.

Lighting.—We should say the shortest exposures will be with 3, next with 4. but much depends on proper arrangement, so that it is only a guess to name exposures; but at f/8, say, four seconds with 3; five to six seconds with 4.

T. B.—The advertised aperture of the Series III. double anastigmats is f/6.8, which agrees with your measurements. The figures on the iris evidently refer only to the relative exposures required. No lens is issued with a marked aperture of f/384.

Numbering Machine.—I have a contract to take photographs of 10,000 men, size of photograph 2 in. square, and I am in want of a machine for numbering each one. Could you kindly tell me where I could get one?—J. W. P.

The Tress Co., 4, Rathbone Place, Oxford Street, W.

Photogravure.—(1) Will you kindly give the address of a firm who will make a first-class photogravure block, and (2) please say if this can be printed from by a local printer?—R.

1. Waterlow and Sons, London Wall, E.C.2. 2. No; the blocks require to be printed by a photogravure printer and in a photogravure press.

R. S. W.—We do not think that you could do better than place the lamps in a row so that the centre one came into the position formerly occupied by the arc lamp—a 2,000 c.p. lamp there, with a 1,000 c.p. two feet from it on each side, would answer well. By spreading the lamps thus, you will be able to do with less diffusion. It is a good plan to have the lamps to raise and lower, as you can thus greatly shorten the exposure with children and sitting figures.

D. L. M.—Considering the facts as you state them, it is not possible for us to say whether there has been, as you allege, gross misrepresentation, inasmuch as there is no standard of what is a light place and what is a heavy one, although we can quite understand that you have been bitterly disappointed as to the nature of the business. At the same time, we think that by accepting the £2 and giving a receipt for it, in the absence of any other written agreement, you have forfeited any further claim for payment to yourself in respect of having taken on the position.

R. R.—Your question is a little out of our line. We should think a really good stationer could procure for you award cards bearing a decorative design, with an open space on which any required printing could be done. We know such things are issued in the printing trade, but we do not know who are the firms actually putting them out. Of people in the photographic business, the best firm is Messrs. Hood and Co., Middlesbrough, who are very good printers, have a lot of little specialties in the way of decorative cards, and very likely would be able to supply you with what you want.

Enemy Debt.—Could you again favour us by indicating the procedure to be adopted in recovering a debt due to us since before August, 1914, by a German? The debtor is interned, and we hold a decree of the Court against him.—H. F.

We advise application in the first instance being made to the Secretary, Trading with the Enemy Branch of the Treasury, Treasury Chambers, Whitehall, S.W., for leave to enforce the judgment. Full particulars should be given to the secretary of any property in this country belonging to the debtor available to satisfy the debt.

Studio Lens.—I am desirous of purchasing a secondhand lens for studio use. I require it for postcards to 1-1 plate groups. What is an approximate focus to purchase? About a reasonable price? The best aperture? The diameter of lens flange?—F. H.

You do not mention the length of your studio, but, assuming it to be 20 ft. or more, we think that your best choice would be an anastigmat, with an aperture of f/4.5, and a focal length of ten inches. If you find this too costly, one of f/5.6 aperture would probably suit you. We are afraid that under present conditions you will have to pay nearly list price for such lenses. The diameter of flange would be about 2¾ inches.

Retail Business.—Could you oblige by giving me any information with regard to taking over and reopening my brother's business, the same having been closed down two years owing to his being with H.M. Colours. I myself am a discharged soldier after two years' service, and have a business three miles from the one mentioned. The business is not a new one. Shall I have to apply to M.N. Service before I can re-open in my own name?—H. H.

The Order states that it is necessary to obtain a licence for the opening of a retail trade or business at premises not hitherto used by the retailer for such trade or business, and since the proposed new business would appear to be entirely your own, and not opened on behalf of your brother, we think you will need to make application for a licence. The address for your district is: Director of National Service, New Arts Building, Liverpool University, Liverpool.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully prepaid, senders of line announcements are asked to bear in mind this revised tariff, and to make use of the schedule on page xii. of the "B. J." for April 26, by which the number of words in any announcement can be reckoned. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less 1/-
Extra words ... ... 1d. per word.
(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

"Box No." and office address ... ... charged as 6 words.
For forwarding replies add ... 6d. per insertion for each adv't.
If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH

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SUMMARY.

The London Salon exhibition, which opened on Saturday last, is one of special interest, and the works shown are of high quality, our American friends contributing not a little to the general high note of the exhibits. The review on page 424 deals with the portraits Next week we hope to publish a personal impression of the exhibition from the pen of Mr. F. C. Tilney.

In a leading article we deal with some of the restrictions of the time, among them the Order relating to the establishment of a "new" retail business only by licence granted by the Ministry of National Service. The Order applies also to branches of existing businesses, and inquiries in reference to it require to be addressed to the appointed branch of the Ministry of National Service. The provisions of the Registration of Business Names Act appear still to be unfamiliar to many of our readers. We deal with the chief of them, and further add some notes on the salient provisions of the Shops Act. (P. 422.)

That indefatigable worker, Professor Namias, has put forward a somewhat novel method of dealing with flat negatives by bleaching in two stages and redeveloping in the ordinary way. (P. 422.)

A further instalment of Mr. F. W. T. Krohn's paper on the mechanism of development, containing some important tables, appears on page 425.

It is a hopeful sign that the French Photographic Society, after a long period of suspended animation, has recommenced the issue of its Bulletin. (P. 421)

A note as to the desirability of the artist sometimes sacrificing his ideals to the sitter's desire for a portrait rather than a pictorial composition will be found on page 421.

Some hints on the use of flashlight for studio portraiture, where no other form of artificial light is available, are given on page 422.

A mechanically actoated retouching pencil is the subject of a recent patent, the lead being given an eccentric rotating movement. (P. 428.)

The advance in the price of plates continues to hold the attention of our correspondents, several letters being devoted to the subject. An interesting note on stripping films also finds a place among the correspondence on pp. 430, 431.

Queries relating to stress markings, tank development, mercury-vapour lamps, and the restoration of foggy plates are dealt with, among other subjects, in "Answers to Correspondents." (P. 432.)

Drawings and particulars of a camera for use under water will be found among "Patent News." (P. 429.)

Mr. R. N. Speaight has been granted the Belgian decoration of the Chevalier's Cross of the Order of Leopold II.

EX CATHEDRA.

Portraits or Pictures. The first object of the professional photographer should be to satisfy his client, the second to satisfy himself. When these two objects can be merged into one, all is well, but if either has to be sacrificed, it must be, to some extent, the latter. The skilful operator, who has thorough control of his light and materials, usually has a predilection for a particular style, and often loses sight of characteristic points in the sitter in bringing him into conformity with it. Hence the less technically skilled operator, even the raw amateur, often scores a success by securing a real portrait, the imperfections of which are passed over for the sake of its human interest. This is especially the case with people who do not often visit the photographer, and who feel rather ashamed of doing so. With such there is often a feeling of constraint and a fear of looking foolish, which results in a stiff, repellant picture, with which neither the sitter, his friends, nor the photographer are satisfied. It is far better with subjects of this class to concentrate all one's powers on the task of reaching the real personality of the sitter, and of overlooking any little defects of pose or drapery. With many people the mere request to move the head, the arms, or even the hands is enough to produce a nervous tension which is reflected in the face; while there are others who feel that they have not received proper attention unless they have been fussed about before exposure.

* * *

The French Photographic Society. It is pleasant to see a sign of restoration of the activities of the French Photographic Society, which since the outbreak of war has practically suspended all its usual public functions. True, the sign is a small one—the publication of an issue of the Society's Bulletin covering the period December, 1915, to December, 1917—but there is the expression of hope that, as the national crisis is now positively subsiding, the society may look to resume something like its normal life. A large proportion of its officers have naturally been occupied upon military duties. Its secretary, Captain Cousin, as he now is, has taken an active part in the photographic section of the air service, and has been awarded the distinction of Chevalier of the Legion of Honour. Death has removed from its ranks a prominent member in the person of Lieut.-General Houdaille, with whose name are associated several investigations in scientific photography; and it can hardly be expected that when peace is restored to France the society's membership will not have been sadly depleted by the protracted conflict. Nevertheless, we join with our French friends in anticipating the days when thoughts can be again devoted to the art in the foundation of which their country took so distinguished a part.

Studio Slides. One of the greatest comforts to the single-handed operator is to have a sufficient number of slides to enable him to complete a sitting of any reasonable number of poses without having to refill. In this respect the American camera makers give us a good example. Instead of supplying one or two slides heavily and expensively made, each holding two plates, the Americans send out their studio cameras with any desired number of cheap light plate-holders, each carrying one 7 by 5 plate. The camera stand usually has a rack on either side, one being for unexposed and the other for exposed plates. The single plate-holder has much in its favour; it is an absolute preventive of double exposures, which often occur through forgetfulness as to whether it is the first or second plate which has to be used, and it is actually easier to fill two slides each with one plate than to put two plates edge to edge in one frame without the risk of overlapping. This is naturally not the time for alteration in studio equipment; we must be thankful now if we can get the simplest repairs done, but after the war we hope that, as in many other things, it will be seen that the old way is not the only way, and not even the best way, nor the cheapest. As in every other walk of life the feminine element will have more influence in photographic matters, we may perhaps look forward to a change in the fashion of studio slides.

* * *

Intensification of Flat Negatives. We note in the Italian journal "Progresso Fotografico" a suggestion of Professor Namias for dealing with negatives which require considerable improvement of contrast. The method is one which is deserving of mention, inasmuch as it utilises intensifying solutions in common use, and yields a result which should not be open to objection on the ground of impermanence. The negative is first only partially bleached—only to the half-tones—by a very short application of a bleaching solution as used for the chromium intensifier, *i.e.*: Potass bichromate, 2 gms., hydrochloric acid, 5 c.c.s., water, 1,000 c.c.s. As soon as the half-tones only have been bleached, as judged from the back of the plate, the latter is well washed, immersed in a bleaching bath of mercury bichloride until fully whitened, and again well washed. It is then re-developed in full daylight until thoroughly darkened through to the glass side. The *rationale* of the process is the conversion of part of the image into silver chloride, and of the remainder into silver-mercury chloride. The former is simply restored to metallic silver, but the latter to metallic silver and mercury.

* * *

Studio Flashes. Although "smokeless" flash powders have been advertised from time to time, we are afraid that the description is far from accurate, for with the best of them the atmosphere of an ordinary studio would be unbearable after, say, four flashes in rapid succession, and long after the air was breathable again there would be enough smoke left to prevent any chance of making a bright negative. We must, therefore, find some method of evading this nuisance, and this is best done by firing the flash in a closed receptacle, so that the smoke never enters the studio. This may be done either by making a cabinet, with a tube or chimney communicating with the open air, or by firing the flash outside the studio window. The latter is perhaps the better course, as the floor space of the studio is not encroached upon, although the necessity for a cabinet is not removed, as not only is a reflector behind the light very desirable, but it is necessary to cover the flash to prevent annoyance to the neighbours. A light wooden or iron box about three feet square on the front and twenty inches deep may be hung close under the eaves of the studio, and this, furnished with a pan and igniting device, is all that is needed. If of wood, the interior and exterior should be thickly coated with whitewash. The top of the box should have a six-inch hole to allow the smoke to escape, this being covered with a lid supported on blocks to keep the rain out; a pane of glass should be made to hinge or move otherwise, so that the lamp can be recharged from the inside of the studio. A cabinet for inside use may be made on the model of a "Punch and Judy" show, a light wooden framework being covered with canvas which is well whitewashed on both sides; the proscenium opening, which should come lower down than in the genuine article, is covered with close muslin or nainsook, which should be saturated with alum or tungstate of soda. The chimney may be of card if straight or of calico sewn over a spiral wire, the outlet end being carried into the open air by any convenient route. In these days of electricity, flashlight is not often used in regular studio work, but there are many working in camps or villages to whom it is a necessity for winter work.

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RESTRICTIONS OF THE TIMES.

In order that there may be liberty for mankind in the largest sense, people of every country require to submit during the process of its realisation to restrictions which are, upon a minor scale, a negation of the conception which most of us have formed of individual liberty. While we may chafe at them, it must be admitted that they form a part of the national machinery which moves for the attainment of the common aims of the Allied nations. After all, most of them are not of such severely restrictive character that they obstruct the course of national life; they may, as they are intended to do, divert it into other channels, and though hardships may be felt in individual cases, annoyances and disappointments will be most frequently the result of omission to recognise that things are not in the pre-war *laissez-faire* condition. Leaving out of consideration the military regulation and prohibition of photography in many places as something which is best investigated locally, it may be of service to call attention to one or two present-day restrictions, the need of emphasis of which is proved to us by questions which constantly reach us.

One of these is the Order of the Ministry of National Service permitting the establishment of a "new" retail business only by licence granted by the Ministry. There is no doubt that a photographic business which deals with the public comes within the scope of this Order, whether the trade consists in the taking or making of photographs, or the supply of photographic requisites. A "new" business is defined as one established after the date of the Order. viz., February 18, 1918. The Order applies not only to a new business but to a new branch of an existing business, which latter may be a retail business opened at premises not previously used by the retailer for such business, or may be the opening in existing premises of a business not previously carried on by the retailer. While the intention of the Order is obviously regulative in the sense of prohibition, it need not be taken for granted that the opening of any and every new business is necessarily forbidden. The position is that a business must be carried on under a licence granted in reference to the character of the business, the needs of the locality, and the circumstances and record of the applicant. Applications for the licence are dealt with by branches of the Ministry of National Service, to one or other of which application should be made (in writing) according to the applicant's geographical position. The addresses of these so-called "Regional Headquarters" and the parts of the country with which they deal are as follows:—

Region.	Area Covered.	Regional Headquarters
London	The Metropolitan Police Area ...	Session House, Newington Causeway, S.E.
East Anglia ...	Essex, Hertford, Buckingham. Berkshire, Oxfordshire, Bedfordshire, Huntingdonshire, Cambridgeshire, Suffolk and Norfolk (except that part of Greater London covered by Metropolitan Police Area)	82, Westbourne Terrace, Paddington, W.
South-Eastern.	Kent, Hampshire, Surrey, and Sussex (except that part of Greater London covered by the Metropolitan Police Area)	84, Westbourne Terrace, Paddington, W.
South-Western.	Gloucestershire, Wiltshire, Dorset, Somerset, Devonshire, and Cornwall	5a, Union Street, Bristol
West Midlands	Counties of Staffordshire, Shropshire, Warwickshire, Worcestershire, and Herefordshire	Queen's College, Birmingham
East Midlands	Lincolnshire, Nottinghamshire, Derbyshire (except the district including Glossop and New Mills), Leicestershire, Rutland and Northamptonshire	South Road, Nottingham
Yorkshire	Yorkshire (except Cleveland district)	(Till further notice.) C/o Assistant Director of Recruiting, Harewood Barracks, Leeds
North Western	Lancashire, Cheshire, with the district including Glossop and New Mills in Derbyshire	New Arts Building, Liverpool University, Liverpool
Northern	Northumberland, Cumberland, Durham and Westmoreland, with the Cleveland District of Yorkshire and Berwick	7, Saville Place, Newcastle - on - Tyne
Wales	Wales and the County of Monmouth	Technical College, Cardiff
Scotland	Scotland, except the town of Berwick	20 & 22, Grosvenor Street, Edinburgh

Another piece of war-time legislation is the Registration of Business Names Act, the provisions of which are frequently the subject of inquiries which reach us. The most common misconception in regard to it is that it applies only to aliens of enemy nationality or, at any rate, to aliens. Nothing of the kind, of course: though it is framed as a measure of restraining enemy penetration, it applies to persons of any nationality carrying on business in this country. The Act is directed against businesses conducted under a fancy or a disguised name—a favourite device of the insidious German. There is nothing in it which prevents a business being run in this way; but, if it is, the Act provides that customers of the firm shall know who they are actually dealing with, and moreover that an official register of such firms and of any changes which take place in them shall be kept. That being so, and in view of the fact that many a photographer acquiring a business has a liking for giving it a more attractive name than his own may happen to be, it is necessary to bear in mind what are the circumstances in which it is compulsory to register the business name. It is compulsory to register if the title of the firm does not consist simply of the partners' true surnames with nothing added to them beyond their true Christian names or initials. In the case of an individual, his true surname with no addition other than his true Christian name or initials. Also, and independently of the foregoing, it is compulsory to register if an individual proprietor or partner has at any time changed his name. He may be carrying on business under his present name, but if that is not his original name the Act enforces registration. The very narrow wording of the Act thus has the effect of drawing within its net firms or persons who might not suspect themselves to be affected by it. For instance, A. Jones trading as "Jones and Co." must register; the "and Co." is the addition to his true name. Similarly, for the same reason, he would have to register if trading as "James Brothers," even though he were, in a firm so titled, really trading in partnership with a brother. Also an adopted change in the spelling of a name or the adoption of an additional Christian name brings an individual within the Act, and likewise applies it to a firm in which such individual is a partner.

So much for the things which make registration compulsory. The further important part of the Act is that which states the things which any person or firm coming within its provisions must do. Here the Act discriminates between British-born subjects and aliens. Heads of, or partners in, registered firms, are required to state certain particulars of themselves on business catalogues, note-headings, circulars, and other stationery used in the commercial carrying on of a business. If they have always been of British nationality the only particular is their true Christian name (or initials) and surnames that is unless they have changed their names, in which case the previous name must also be stated. But in the case of an alien, even though naturalised in this country as a British subject, the nationality or former nationality must be stated, together with particulars of the Christian names (or initials) and surname, and also of any previous name. It is not required to put any of these particulars on the facia of business premises, nor on mounted photographs or postcards.

Although not a war measure—in fact, of six years age—it would seem that the Shops Act is imperfectly appreciated by some of our correspondents, perhaps for the reason that in some places a measure of latitude has been observed by the local authority in enforcing its provisions in commendable recognition of the circumstances of the time. In other places, however, ignorance of its scope may be the means of bringing the proprietor of a business into unwelcome conflict with the local powers that be. Therefore let it be made clear in the first place that the Shops Act has nothing to do with Sunday closing. The keeping open of a place of business on Sunday is a breach of the old Statute of the reign of Charles II., but as the Act is unenforced in many places, and as, moreover, the maximum fine is one of 5s., photographers opening on Sundays are not affected by it to any appreciable extent. By the Shops Act, however, several distinct things are regulated—viz., the closing of a business during the one-half of a weekday in each week, the granting of one half-day holiday to assistants (apart from Sundays), and the hours during which assistants work. In regard to the first of these, the part of a photographic establishment to which the public has access for the purpose of giving orders is a "shop" within the meaning of the Act; other workrooms come under the Factory Act, and are exempt from the provisions of the Shops Act. And as regards the half-day closing, much latitude is left to the discretion of the local authority for dealing with different days, although in small towns there is one appointed half-day in which all "shops" are to be closed. The assistant's half-holiday may be on the closing day or on any other day, with the qualification as regards the latter that notice must be posted up as to the day appointed, before assistants leave on the previous Saturday. The Act also prescribes intervals for dinner and tea for assistants, that for the latter being compulsory only when assistants work up to seven o'clock or later. Assistants who come within the

Act are, it will be understood, those occupied in or about the "shop" part of a photographer's premises. A doorman who stands outside and may canvass for orders has been judicially classed as a shop assistant. Those who may feel the occasion for any further instruction in the Act cannot do better than obtain the Memorandum relating to the Shops Act issued by H.M. Stationery Office, Kingsway, London, W.C.2, price 1½d. post free.

THE LONDON SALON.

It is quite evident that portrait photography has really "got a move on" at last. The Salon has never shown so full a crowd of really interesting and striking things. From the old-established to the latest arrival the year's work sounds a high note. William Crooke, of Edinburgh, scores best with his three-quarter length of Major Hugh Simpson (230), of which the general lighting is airy and gives a good impression of space around the figure, although the illumination of the face is somewhat complex. Mr. Crooke's work still retains its force, power, and brilliancy.

To switch from the old-established to the latest arrival is to come face to face with a figure series by a lady who signs herself "Jay." They represent the feminine emotions (and a vice or two). The picture depicting Mrs. Jay's notion of feminine "Trepidation" (165) is a print of that kind which could not be produced fast enough for sale as a postcard in a Soho "Librairie Française" in these free and frank times.

Cecil, Basil, and sportive professionals of their class are well to the fore. Cecil sends a fine print of a hesitating devotee who maintains a profile position for the benefit of the operator who evidently did not wish him to obscure the crucifix by adopting the conventual *vis-à-vis* position. The title is "Father Nolan" (3), but the print has more the air of a fancy picture than a portrait. It is good in design and tonal scheme. A mother and child are beautifully grouped in "Lady Scott and Her Son Peter" (82). More interesting in point of view of lighting is "Margaret Bannerman" (108), posed against a wide window from which the light filters through her gossamer draperies. "Curds and Whey" (112) is a little girl drinking out of a basin; very good, except that she appears to have her nose rather than her mouth in the beverage. Another little blemish exists in "Miss Troubridge" (135), a veiled black figure of nice sentiment, but displaying a hand the scale and shape of which are not happy. Mr. Hugh Cecil will not think us uncharitable in thus pointing out what we think the public would certainly fasten upon to the inevitable discredit of works otherwise eliciting all praise. These trifles are too often overlooked in the familiarity of the photographer with his own work throughout the processes; but a fresh eye catches them at once. Basil's young nude girl, "Child Study" (47) is a first-rate exercise in broad tones with good modelling, the figure standing against a light background, whilst the solid and statuesque modelling of his "Head" (186) forms a marked variety in treatment. In this, the curious headdress, which is the last word in simplicity, and conceals the hair, has been a great help to the broad, plain, and plastic treatment which is the evident motive.

The London Salon is this year much indebted to American work, and perhaps the most extensive selection from the other side comes from Louis Fleckenstein, who has never shown us better work. His "War Widow" (139) is a print of great beauty, finely composed and even finer in lighting. "Dawasonta" (144) is the life-sized head of a Red Indian lady, and we must confess to never expecting such personal charm to exist in a race of aboriginals. "Betty" (147), in a black hat and cloak which makes of her nothing but a geometrical figure upon a plain background, is a little helped out by a shadow on the wall.

Shadows are all in all to Mr. Fleckenstein, who shows his sitter, "W. A. Hudson" (143) well out of the way, so that he shall not spoil the sciagraph. This method may be seen also, by Hugo van Wadenoyen, in "An American" (149), a young man with a cigarette. In a more ordinary style the same photographer presents an imposing portrait of Mr. Matheson Lang (176).

Alice Boughton has achieved one of the most lovely things in the collection, a "Mother and Baby" (41). There is no high-falutin maternal sentiment about this, but it has the merit of a faultless design and composition, with a healthy treatment of light and shade that is forceful and graceful. Walter Benington sends a smart figure of a girl in a hideous "Striped Dress" (36). This, however, is the kind of thing people in the poster line are persuading themselves to prefer. It is a striking little print with fine quality. Young persons of the fancy figure order are also sent by Andrew Barclay. In a similar vein is A. F. Kales' "A Daughter of the Desert" (18), a lady attired in a blanket and turban, and smiling hard. Mr. Kales shows other excellent work besides this Idyll of the Turkish Bath, which boasts of much quality. The Earl of Carnarvon contributes a dancing lady with a tambourine, rather dull in tone values, entitled "The Dance" (1); also a charming classic piece which he calls "Faun," regardless of the model's sex. Stranger in tone, but not in design, is his "Dacia" (123), a study in simple tones of black and grey, with a glistening accent on the lady's eyeballs.

But none of these things can rightly be styled portraits in the professional sense. They are, perhaps, valuable evidence of the versatility and skill of their authors, as well as useful bids for popularity, but they seem destined for the illustrated weeklies rather than the family album or mantelpiece. The Earl's altogether lovely "Portrait" (22) is, however, legitimate portraiture, and at the same time eminently pictorial. Beyond the personal charms of the sitter, which were to the photographer's advantage at the outset, he has availed himself of every resource to make up an *ensemble* of lightness and grace. The pose of this head and bust is simple in the extreme, yet free and full of life. The lighting gives modelling and roundness every chance, and the treatment of tone and definition gives the whole thing a rare softness and delicacy which would be hard to beat.

Bertram Park keeps on the lines admirably this year—a sure proof that maturity in an art makes for chastening of judgment. Two of his portraits in this show are wonders of richness, brilliancy, and charm of lighting. They are further imbued with a sense of style and sureness of taste which must prove of the greatest value in a select clientêle. The two very similar prints, entitled respectively, "The Rt. Hon. Lady Lovat" (38) and "The Rt. Hon. the Countess Poulett" (104), have the old mezzotint as an ideal, and the former particularly is extremely charming. The mezzotint has obviously inspired Marcus Adams also. His portraits of children are more arresting than they have been for a year or two past. On the margin of "Reflection" (23), a little girl seated very demurely, the title is inscribed in the script characters of old copper-plate, and the mount simulates the discoloured paper of print-sellers' window specimens. Perhaps Mr. Adams was not well advised to use swathes of tulle around the nakedness of a baby, "The Young Prince" (145). We do not display our youngsters in this guise even in the nursery and the bathroom.

Two works by Herbert Lambert are of importance here. One is a rather pompous, but cleverly carried out, portrait of "Cyril Scott" (121), who is, however, adopting too self-consciously the pose of the great composer. The other is a young girl, bright, pretty, and spontaneous: a true British "flapper" of the healthy type. This is "Nancy" (199), admirably posed and nicely lit.

A head of much charm which E. P. Beaufort calls "Œnone" (30), is mounted with good effect in a circle, upon which, however, the photographer has failed to resist the temptation of inscribing his name. As he has done so clumsily in pencil his print suffers in consequence.

High technical merit characterises a portrait by Nicholas E. Smirnoff of a placidly smiling gentleman in a light suit who stands before a bright background, "Mr. Richard Lake, F.R.C.S." (204). Purists in photography will scarcely be able to tear themselves away from this little gem of clean and masterly work, the best of many examples by the same hand, unless it is to enjoy the "Study" (173). This is a charming example of the picturesque effect of indoor lighting. A lady stands in a corner by a window. Her face and costume are fully modelled in spite of the acute lighting, and the whole arrangement is tasteful, clever, and full of feeling. W. J. Beadle's "Personality" (209) is very telling. It is little more than a mere face; but the reaching forward pose and the intense expression certainly justifies its title. Posing is remarkable also in H. Mortimer Lamb's "Portrait" (231): a lady almost at full length, with a walking stick, and swaying backwards in an attitude very suggestive of action. There is nothing more spontaneous in the room.

S. W. Shore's "Portrait" (16) is a full-size head of an elderly lady. The print is trimmed close, but the filling of the space is quite satisfactory, and the life and truth of the face give the work much force and distinction. For one thing, it is strong and full-scaled in its tones, which is by no means a common merit in large work. There are some enlargements here that are tame and flat without any reason or need, as it seems to us. When a portrait is nothing more than the still lineaments of a face "writ large," without the beauty of light and shade, and without any natpral and pictorial effect, it is not likely to stir up enthusiasm. Much better is it to incorporate some idea that will make the thing a picture. Mr. Smirnoff's "Study," to which we have referred, is life-like enough to answer the purposes of any rightdown, pure, and simple portrait, yet it is in itself a fascinating work to any who are not acquainted with the sitter. In a less degree, because the figure is relatively too small, E. Henry Weston's "Portrait of Mrs. C." (169) possesses this added merit. Here the sitter reclines before a curtained window through which the sun streams. It has been done often enough before—by the amateur; but how often by the professional?

Louis Fleckenstein admirably secures a charming touch of light on "Baby Pinkham" (152), as well as that vast advantage, a sensation of space and air round the figure. This rich little print recalls a painted portrait of the early nineteenth century. An excellent imitation of an old Dutch master is seen in R. Polak's portrait of "Lady with Coat of Arms" (156), a single figure in a black dress, ruff, and headdress, which might be a photographic reproduction of an old canvas. The coat of arms is a kind of war decoration on the otherwise plain background. The idea seems to us to be worth consideration with sitters who can command the historical knowledge necessary for the make-up. There are, of course, other costume portraits in the room, but none that recalls a picture. Jessie Thomson's smart little "Beau Adair" (319) is a portrait of Mrs. Agnes Bruce Milne, but it is simply a theatrical reconstruction of the life, not of the art, of a bygone day.

Pretty children abound here, as usual. We have spoken of a few by Marcus Adams. We ought also to mention his "Portrait" (168) for the excellent texture of the hair, which is the making of the work. Miss Constance Ellis sends a bonnie head and bust of a little girl called "Fan" (331), remarkable for roundness of treatment. Some fun is seen in Francesca Bostwick's "Portrait Group" (350), which in reality is a little girl in white fur and muff, leaning by a sofa on which stands two woollen nondescript toy dogs. "Head of a Child" (182), by Yvonne Park, her "Figure Study" (181) and "Miss Mimi Crawford" (183) evince much taste and great promise for the future.

All who are interested in figure studies of the nude description will find many here to interest them. They are scarcely within the generally accepted limits of portraiture, and it is not worth while, therefore, to treat of them in this article.

Amongst types of race and character Mrs. Ambrose Ralli's examples are very arresting. Their strength of light and shade are exactly in the vein of D. O. Hill, whose chief merit they perpetuate. The best of all is "Lace Workers" (219). This represents two women working at their pillows in the open air, partly sheltered from the blaze of the sun by a sort of dark entry, in the shade of which they are sitting. The print gives not only the strong sun effect and its great interest from a landscape point of view, but it renders the life and character of the types very convincingly. The modelling is perfect, even in the shadows, and the low tone of the further woman, who is entirely out of the sunlight, is excellently rendered. There are several southern types from Mrs. Ralli's hand, but next to the "Lace Workers" we are best pleased with a strong, rugged head of an old man which is simply described as "Portrait" (299). Dr. Norman Flower's "Study of a Maltese Peasant" (345) is also deserving of remark.

THE MECHANISM OF DEVELOPMENT OF THE IMAGE IN A DRY PLATE NEGATIVE.

(A paper read before the Royal Photographic Society.)

(*Continued from page* 413.)

In Table I are given the readings, after fog deduction, and also the means of the readings obtained with the two films.

Note that the limit of development of the light attacked haloid is practically reached for the shortest exposure (.25 C.M.S.) in about three to four minutes, and for the next exposure (.5 C.M.S.) in about six minutes.

The 1 C.M.S. exposure and higher exposures have barely reached their limits after 16 minutes' development.

For Table II I have taken the maximum density found for each exposure as 100, and have then calculated the percentages of density developed in each case for corresponding lengths of time.

TABLE II.

Mins.	½	1	1½	2	3	4	6	8	12	16
C.M.S. .25	17·50	35·00	52·50	75·00	97·50	90·00	*100·00*	97·50	92·50	85·00
·5	17·27	27·27	42·72	60·00	81·81	89·09	96·36	96·36	*100·00*	98·18
1	15·54	22·71	32·27	45·81	64·54	71·71	84·46	90·04	95·60	*100·00*
	13·40	19.30	28·10	38·90	56·10	64·90	73·70	87·10	95·90	*100·00*

TABLE I.

½ Concentration developer.

Fog and Exposures	Film Nos. and Means.	Times of Development.									
		¾ min.	1 min.	1½ min.	2 mins.	3 mins.	4 mins.	6 mins.	8 mins.	12 mins.	16 mins.
f –	2074	·04	·06	·14	·15	·17	·20	·22	·26	·34	·42
	1932	·03	·04	·08	·10	·12	·14	·20	·26	·30	·33
	Mean	·035	·050	110	·125	·145	·170	210	·260	·320	375
·25 C.M.S. .	2074	04	·06	·08	·12	·17	·14	·16	·16	·13	·14
	1932	·03	·08	·13	·18	·22	·22	·24	·23	·34	·20
	Mean	·035	070	105	150	195	·180	·200	·195	185	170
·5 C.M.S. ..	2074	·10	·14	·21	·31	·41	·46	·48	·48	48	·48
	1932	·09	·16	·26	·35	·49	·52	·58	·58	·62	·60
	Mean	·095	·150	·235	·330	·450	·490	·530	·530	·550	540
1 C.M.S.	2074	·20	·30	·40	·57	·80	·88	1·02	1·10	1·14	1·20
	1932	·19	·27	·41	·58	·83	·92	1·10	1·16	1·26	1·31
	Mean	·195	285	·405	·575	·815	·900	1·060	1·130	1·200	1 255
2 C.M.S.	2074	·30	·43	·60	·83	1·17	1·38	1·66	1·84	2·03	2·06
	1932	·26	·38	·58	·80	1·18	1·34	1·68	1·81	1·99	2·13
	Mean	·280	·405	·590	·815	1·175	1·360	1·670	1·825	2·010	2·095
4 C.M.S. . ..	2074	·39	·56	·78	1·07	1·53	1·82	2·26	2·50	—	—
	1932	·35	·49	·78	1·05	1·50	1·79	2·22	2·44	(2·73)	—
	Mean	370	525	·780	1·060	1·515	1·805	2·240	2 470	—	—
8 C.M.S.	2074	·48	·66	·96	1·23	1·77	2·12	2·66	—	—	—
	1932	·43	·59	·93	1·25	1·77	2·13	2·57	—	—	—
	Mean	·455	·625	·945	1·240	1·770	2·125	2·615	—	—	—
16 C.M.S. ..	2074	·55	·74	1·04	1·39	1·99	2·37	—	—	—	—
	1932	·49	·70	1·06	1·42	1·97	2·30	(2·86)	—	—	—
	Mean	520	·720	1·050	1·405	1·980	2 335	—	—	—	—
32 C.M.S. ..	2074	·60	·82	1·16	1·55	2·18	2·52	—	—	—	—
	1932	·55	·75	1·16	1·53	2·12	2·47	—	—	—	—
	Mean	·575	·785	1 160	1·540	2·150	2·495	—	—	—	—
64 C.M.S. ..	2074	·66	·87	1·24	1·65	2·27	2·69	—	—	—	—
	1932	·59	·80	1·24	1·60	2·25	2·61	—	—	—	—
	Mean	·575	·835	1·240	1·625	2·260	2·650	—	—	—	—

Excepting for a discrepancy in the lowest exposure, at four minutes' development, it is clear that the low exposures race ahead of the higher exposures in their early stages of development, and reach their limits sooner than do the higher exposures. This is shown more clearly in the curve diagram for Table II. (Fig. 3).

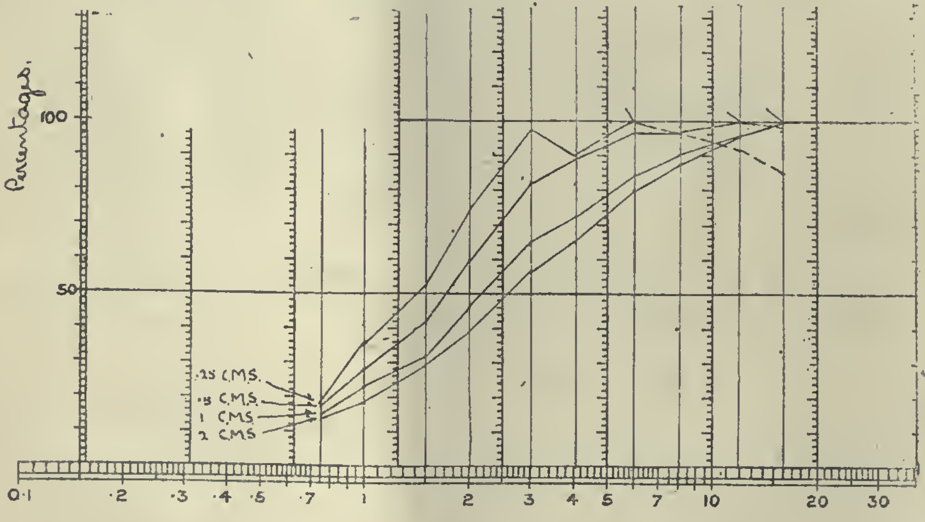

Fig. 3.

The peculiarity shown by the .25 C.M.S. density readings of reaching a maximum and then going off again when development is prolonged, is due to the fact that the fog, which for practical purposes we have to deduct, is greater than the amount of fog actually developed in the exposed parts of the film.

For some reason the fog development in the exposed parts always seems to be held back. To a certain extent this is due to the fact that the developer in these parts is more or less weakened and restrained by the development of the exposed haloid. I do not, however, think that local restraint and weakening of the developer alone accounts for this holding back of the fog development, for I have repeatedly observed a form of fictitious reversal in the lowest exposures of a film during prolonged development, especially when the emulsion is inclined to be very foggy. In these cases the low exposures give distinct but low density readings (after fog deduction) when the times of development are not unduly long; but if development is forced, one obtains minus readings in these exposures, and on inspection the lowest exposures have the appearance of being reversed, on account of the fog density in the adjoining unexposed portions being greater than the density of the silver deposit in the portion of the film which has been given a short exposure. The fact that this peculiarity of fictitious reversal shows up in the *weak* exposures, only when development is prolonged, and when therefore the developer has locally had ample time to get replaced by fresh developer, to my mind indicates that light, even *weak* light, exerts some sort of reversing action on the fog itself.

In Fig. 4 the characteristic curves have been plotted out for the *mean readings* in Table I.

The effect of the irregular development on the curves now becomes apparent. The free development of low exposures and the restrained development of the high exposures, tends to force the inertia point to the left during the first two minutes of development.

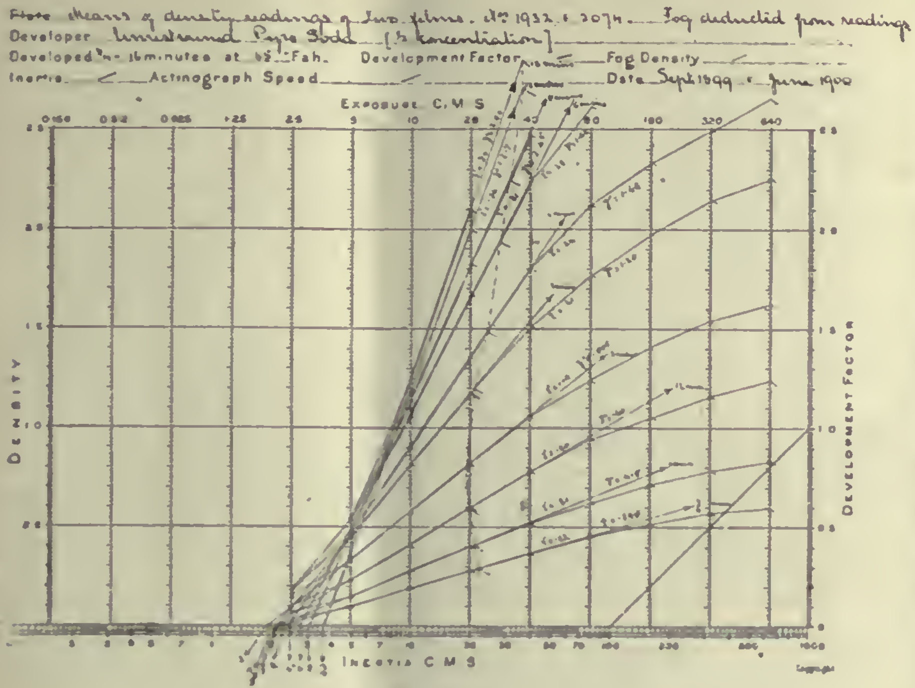

Fig. 4

After that the low exposures begin to slacken in their rate of development to a greater extent than do the higher exposures, and consequently the inertia point now begins to move to the right.

After about eight minutes' development exposures .25 and .5 C.M.S. have reached their limits, and only the higher exposures go on developing, with the result that the .5 C.M.S. exposure, which up to then has been on, or nearly on, the line of correct exposure now gets thrown out.

Fortunately for our peace of mind, the change in the movement to the left of the scale takes place at the point, or just about the point, where the useful development factors are reached. These are γ = .8 to γ = 1.4 for photometer readings with scattered light, and the change in inertia for this range of development factors does not vary excessively as a rule. In the case in point we have:

Development factor	= 0·8	1·	1·4
Inertia	= 0·19	0·20	0·23
Ratio	= 95·	100·	115·

so that by utilising the i value for γ = 1 in giving the speed of the film, we do not get an average difference of more than −5 per cent. to +15 per cent. over the range of useful development factors.

I have tested a great many kinds of plates of different makes, and all show this same peculiarity to a greater or less extent. The average difference amounts to −13 per cent. and +26 per cent., with a similar effect upon the speed readings; and since a difference of ± 33 per cent. is permissible for all practical purposes, we may, as a rule, safely base our speed determinations on the inertia values for γ = 1 as recommended by Messrs. Hurter and Driffield, always bearing in mind, however, that the speed value as determined by the inertia value is not a fixed quantity.

Occasionally one comes across a plate for which the inertia values over a fairly large range of γ values are practically constant, or may even decrease for higher values. When this occurs the plate is more often than not one which is inclined to give fog readily. This type of plate, however, is exceptional so far as I know. It is just possible that this peculiarity may have something to do with imperfect washing of the emulsion.

That the swing to the right after .19 inertia has been reached is not due to excessive fog deduction can be shown by re-plotting the curves *without* fog deduction.

Examination of Table III. shows *why* the lowest inertia is reached just at two minutes' development (γ = .8). In this table the percentage rate of increase in density acquired during each development interval is shown. It will be observed that up to two minutes the rate of growth is higher for the *mean* rate of growth of the two lower exposures .5 and 1 C.M.S. than for the *mean* rate of growth of the two higher exposures 2 and 4 C.M.S.; but after that the rate is lower for the two lowest exposures and higher for the two higher ones. These two mean points (between .5 and 1 C.M.S. and between 2 and 4 C.M.S.) are those which consciously or unconsciously we use when drawing the tangent lines to our curves in Fig. 4.

In Fig. 5, I have shown diagrammatically, but sufficiently accurately, how the characteristic curves in Fig. 4 have grown as development has proceeded. In the actual diagram for the above curves the lines are rather too crowded for clear demonstration.

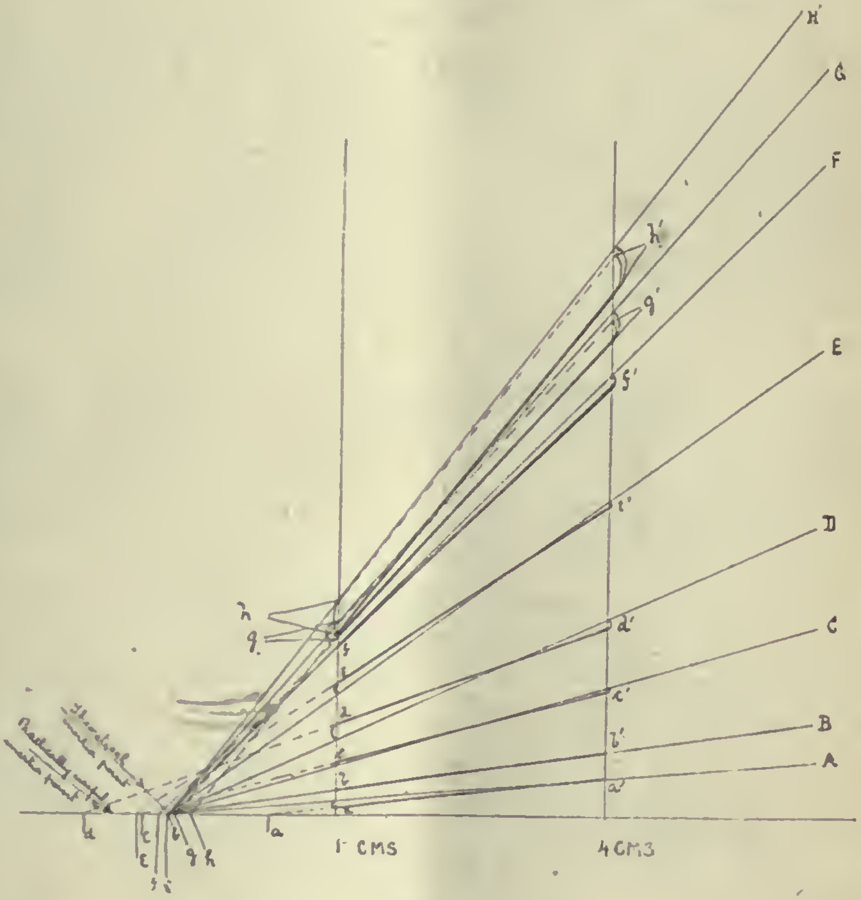

Fig. 5.

In the very earliest stages of development the higher exposures

TABLE III.—Percentage Rate of Increase of Each Density at each Stage of Development.

Exposures.	¾ min.	Per cent. increase	1 min.	Per cent. increase	1½ min.	Per cent. increase	2 mins.	Per cent. increase	2·41 mins.	Per cent. increase	3 mins	Per cent. increase	4 mins.	Per cent. increase	6 mins.	Per cent. increase	8 mins.
Development factors	γ = ·295		γ = ·415		γ = ·60		γ = ·805		γ = 1		γ = 1·20		γ = 1·49		γ = 1·94		γ = 2·25
Fog	·035	*42·9*	·050	*120·0*	·110	*13·6*	·125	*8·0*	135	*7·4*	·145	*17·2*	·170	*23·5*	·210	*23*	·260
C.M.S. ·25—	·035	*100·0*	·070	*50·0*	·105	*42·9*	150	*13·3*	·170	*14·7*	·195	−7·7	·180	*+11·1*	·200	*−2·5*	·195
,, ·5	095	*57·9*	150	*56·7*	235	*40·4*	·330	*16·7*	385	*16·8*	·450	*+8·9*	·490	*8·2*	·530	*0*	·530
mean		*52·0*		*49·4*		*41·2*		*18·6*		*17·2*		*9·7*		*13·0*		*3·3*	
,, 1	·195	*46·1*	285	*42·1*	·405	*42·0*	575	*20·5*	·693	*17·6*	·815	*10·4*	·900	*17·8*	1·060	*6·6*	1·130
,, 2	·280	*44·6*	405	*45·7*	590	*38·1*	·815	*22·1*	·995	*18·1*	1·175	*15·7*	1·360	*22·8*	1·670	*9·3*	1·825
mean		*43·3*		*47·2*		*37·0*		*21·8*		*17·85*		*17·4*		*23·4*		*9·8*	
,, 4	·370	*41·9*	525	*48·6*	·780	*35·9*	1·060	*21·5*	1·288	*17·6*	1·515	*19·1*	1·805	*24·1*	2·240	*10·3*	2·470
,, 8	455	*37·3*	·625	*51·2*	·945	*31·2*	1·240	*20·4*	1·493	*18·5*	1·770	*20·0*	2·125	*23·05*	2·615		
mean		*37·8*		*48·5*		*32·5*		*20·35*		*17·85*		*18·95*					
16	520	*38·4*	720	*45·8*	1·050	*33·8*	1·405	*20·2*	1·690	*17·2*	1·980	*17·9*	2·335				
32	575	*36·5*	785	*47·8*	1·160	*32·7*	1·540	*19·0*	1·833	*17·3*	2·150	*16·0*	2·495				

start before the lower ones, but these once started go ahead more quickly, and in three-quarters of a minute have more than overtaken the lower ones. This I have tried to represent by the lines drawn below the three-quarters of a minute line.

The point to note is that the effect of irregular development is to increase the *H. and D. speed* of the plates, and with unrestrained pyro soda developer the maximum of this increase is usually reached just about the point at which the useful γ value .8 is reached. It may decrease 33 per cent. in value, and even more by the time γ=1.4 is reached, but usually the fall in speed is rather less.

F. W. T. Krohn.

(*To be concluded.*)

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications August 6 to 10 :—

Colour Photography.—No. 13270. The production of complemental images and colour printing. Technicolor Motion Picture Corporation.

Cinematography.—Nos. 12,789-90. Preparation of cinematograph films and subsequent production of moving pictures in colour therefrom. F. Garrett and W. Friese-Green.

Colour Cinematography.—No. 13,201. Method of producing moving pictures in colours. J. Shaw.

Apparatus.—No. 13,240. Photographic and cinematographic apparatus. G. G. B. Tartara.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Rotating Retouching Pencils.—No. 117,520 (August 14, 1917).—The pencil is mounted in a casing; bearings are mounted in the easing; a spindle mounted eccentrically in bosses rotates in the bearings, a holder is mounted on the spindle, and a spring mounted on the spindle provides means for rotating the spindle and holder.

The spindle may be hollow and adapted to take the usual size

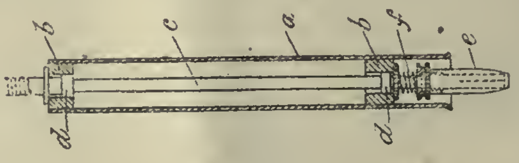

Fig. 1.

of spare leads, and the holder may be provided with a screwed cap to secure a lead in position.

The spindle is disposed axially of the holder and projects at the upper end where it is adapted to be connected to a flexible shaft. The means for rotating the spindle may comprise a shaft, a fly-wheel and toothed pinion on this shaft, a cranked shaft provided with a toothed wheel adapted to engage the toothed wheel on the shaft, a connecting rod on the crank shaft adapted to be reciprocated by a pivoted lever or other simple device. The con-

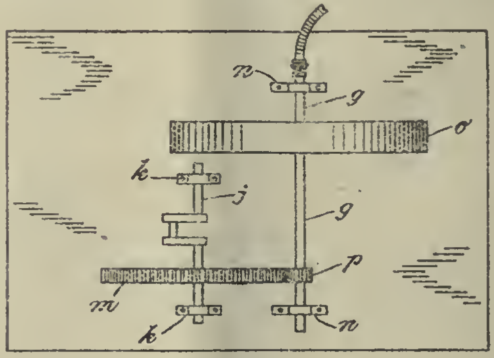

Fig. 2.

struction may be such that could be worked by the hand or elbow of the operator.

In the drawings *a* is the pencil casing provided with bearings *b b*, a hollow spindle *c* mounted eccentrically in bosses *d* is adapted to be rotated in the bearings, a holder *e* mounted on the spindle *c* is allowed axial movement against the spring *f*. The spindle *c* extends through the pencil case and is adapted to be connected by a flexible shaft to the shaft *g* of the motor. The machine or motor for rotating the spindle of the casing may comprise a crank shaft *j* mounted in bearings *k k* and carrying a toothed wheel *m*, a counter shaft *g* mounted on bearings *n n* and carrying a fly wheel *o* and a pinion *p* adapted to gear with the toothed wheel *m*. The crank shaft is adapted to be rotated by a pedal or other means—Arthur John Blackburn, Aruba House, Burnopfield, Durham.

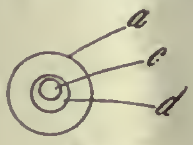

Fig. 3.

Under-Water Camera.—No. 117,841. (July 30, 1917.). The invention comprises a camera which is fitted into a water-tight case provided with a lens in alignment with the lens of the camera and capable of withstanding the pressure of water at great depths. The camera shutter is operated electrically through a cable brought to the surface, or by a diver under water, and the watertight casing has fitted to it, externally, water-tight chambers, provided with lenses, for containing electric lamps, which may be of the self-contained type having their own battery or accumulator, or of the pattern which is supplied with current through an insulating cable from the surface.

In the drawings *a* is the camera, and *b* is the case into which the camera *a* is fitted, and in which it is rigidly held in position by the internal ribs *b'*; the case being furnished with the cover *c* bolted to the body *b* in such a manner as to provide an entirely water-tight receptacle for the camera *a*. *d* is the window with which the case *a* is provided, the window being in alignment with the lens of the camera, and *e* (fig. 2) is the finger-piece or lever which controls the shutter of the camera, the lever being itself actuated electrically advantageously in the following way:—Adjacent to the lever *e* there is arranged the armature *f* of an electro-magnet *g*, the armature *f* being pivoted at *h* and current being supplied to the electro-magnet through the cable, so that the armature *f* can be, when desired, attracted by the magnet and so caused to operate the shutter by contact with the lever *e*.

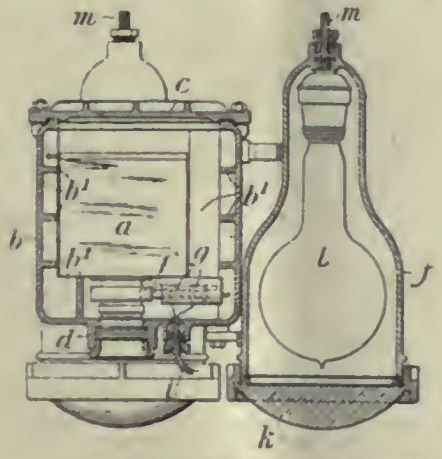

Fig. 1.

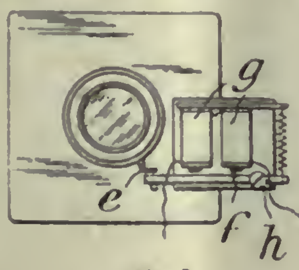

Fig. 2.

j is one of three water-tight chambers which are secured to the water-tight casing *b*, and the lower ends of which are furnished with lenses *k*, the position of which, relatively to the camera, is such that the rays from the electric lamps *l*, fitted within the water-tight chambers *k*, are concentrated upon the object to be photographed. Robert Henry Davis, 187, Westminster Bridge Road, London.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, September 21.

Hanley Photographic Society. Outing to Mill Dale and Barthomley.
Halifax Scientific Society. Outing to Crimsworth Dean.

Tuesday, September 24.

Leith Amateur Photographic Association. Annual meeting.
Hackney Photographic Society. "Toning Bromide Prints." G. H. Capper.
Manchester Amateur Photographic Society. Open Lantern Meeting.

News and Notes.

Italian War Photographs.—An exhibition of Italian war photographs will be opened to-day (Friday) at the Mendoza Galleries, 13, Old Bond Street, W. It will include some remarkable photographs of the Italian front.

Mr. Richard N. Speaight has been decorated by King Albert with the Chevalier's Cross of the Order of Leopold II., dated August 10, 1918. It will be remembered that last year Mr. Speaight visited the Belgian front, taking there a series of portraits, including the official portrait of King Albert.

Photographs of Girl War-Workers.—Photographers all over the country will be interested to hear that the sum of £500 is being offered by the Sheffield "Weekly Telegraph" for photographs of the most attractive-looking girls on war work The prizes include both group and individual photographs.

Evening Classes in Photography.—The new prospectus of the Regent Street Polytechnic Photographic School is now ready, and will be sent on application. There are classes in negative and print making, enlarging, portraiture (elementary and advanced), retouching, finishing, B. and W. and colour and process work. The hours are from 7 till 9 p.m., and the fees low. Practical work is done by the students in all classes. The teachers will be in attendance to enrol students every evening from September 22 to 26.

L.C.C. School of Photo-Engraving and Lithography.—We have received the prospectus of the day and evening classes to be held at the Bolt Court School, Fleet Street, for the session 1918-19. Commencing on Monday, September 23, the courses of instruction include photography for reproduction purposes, processes for relief printing, processes for surface printing, intaglio printing processes, ~~as well~~ as drawing classes and descriptive courses of lectures. Fuller information in regard to fees, and time-table of evening classes, will be found in the prospectus, obtainable from the Principal, Mr. A. J. Bull, M.Sc., Bolt Court School, Fleet Street, E.C.4.

Photographs of an Aeroplane.—At West London Police Court last week, Marinus de Keyser, 28, a Dutch subject, employed at an aeroplane factory, was charged with having taken photographs of military work—namely, an aeroplane—at a factory. The point had been raised (as reported in last week's "B.J.") that an aeroplane was not a military work under the Defence of the Realm Regulations. The prohibition was directed against a photograph of premises where military work was carried on. Mr. Barker, for the Public Prosecutor, agreed to accept the magistrate's decision on the point, and withdrew that charge. The defendant, however, was charged with having taken two other photographs at the factory, and these were considered of use to the enemy. It was stated that at the request of two other workmen, both Englishmen, he took photographs of them opposite an aeroplane. The photographs showed a portion of the building.—Detective-Sergeant Parsons said that there was no reason to doubt that the defendant was a loyal man.—A fine of £5 was imposed.

Lectures on Technical Optics.—The Department of Technical Optics of the Imperial College of Science and Technology, under the direction of Professor F. J. Cheshire, has arranged a course of lectures for the session 1918-19. The lectures, with corresponding laboratory work, are specially designed to meet the needs of part-time students engaged in the optical industry, but are available also for students who wish to study applied optics with a view to entering the profession of optical designing and testing. For the present, and pending the establishment of full-time courses of study, the case of each student wishing to enter the department for full-time work will be specially considered by the Director of the Department, who will determine the course of study to be followed. The lecture courses for the coming autumn are as follows:—"General Optics," Professor F. J. Cheshire, beginning Friday, October 4, 2.30 p.m.; "Optical Designing and Computing," Professor A. E. Conrady, beginning Monday, October 7, 2.30 (suitable for beginners); "Practical Optical Computing," Professor A. E. Conrady, beginning Tuesday, October 1, 2.30 (for more advanced students); "Workshop and Testing-Room Methods," Professor A. E. Conrady, beginning Thursday, October 3, 2.30 p.m.; "The Construction, Theory and Use of Optical Measuring Instruments," Mr. L. C. Martin, beginning Wednesday, October 2, 2.30 p.m. Each of these lectures will be followed by a laboratory or computing class, "Microscopes and Microscopic Vision," Professor A. E. Conrady, beginning Thursday, October 3, 5 p.m. All inquiries in respect of the lectures should be addressed to the Registrar of the Imperial College, Imperial Institute Road, South Kensington, S.W.7.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

⁂ *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE ADVANCE IN THE PRICE OF PLATES.

To the Editors.

Gentlemen,—The many letters on the advance in price of plates prompts me to write again.

In the first instance, I would like to say I do not see any good in picking other persons' letters to pieces, for that only promotes ill-feeling. I think I am right in saying that trusts, combines, rings, amalgamations, or whatever they may be called, are supposed to be advanced methods of successful trading, and done to prevent competition.

It might interest your readers who are not already aware of the fact that as far back as 1887, I think, the Sewing Cotton Manufacturers, through an association, started what they termed a central agency, each agreeing to sell certain size reels at a fixed price. Since that time prices have gradually increased, and so have the dividends. The last dividend declared, I think, was 40 per cent. Here is all the evidence one wants as to how successful they have been in bleeding the purchasers of their manufacture for their own material ends.

It looks to me as if the plate manufacturers are on the same game. They have formed a so-called ring, and agreed to sell at a fixed rate, and no power on the part of photographers can alter it if the manufacturers choose to stand firm. Legislation is the only remedy which will make it illegal for such combines, trusts, rings, etc., to operate.

I think that the price of plates, papers, and postcards would have been much lower to-day had no ring existed. Competition in mounts, covers, etc., exists; hence the other day I was able to place an order for covers at exactly half of another firm's price.—Yours faithfully, Ernest A. Day.

Granby Street, Leicester.

To the Editors.

Gentlemen,—A number of your correspondents, I am sure quite unconsciously, have been paying the P.P.A. a compliment in attributing to it as great a power as Government itself, but, whereas Government makes the laws which people have to obey, the P.P.A. does not make the laws, but has to act in accordance with the laws made for the people. Photographers as a class are, I believe, sufficiently acquainted with the constitution of our country to understand this fact; but some either do not know it or, recognising it in the abstract, fail to realise its application to such a matter as the rise in the price of plates. It should be obvious to everyone in business that the P.P.A. has no power to dictate to any plate-maker or combination of plate-makers the terms upon which they shall supply their manufactures. They have exactly the same right to fix their prices as every photographer has in fixing the prices of his photographs.

But to point out to the plate-makers the great business difficulties that the abnormal rise in prices of all photographic material, plates in particular, is causing and will cause, and to invite them to consider the position from our point of view as well as their own, and to meet us as far as circumstances will permit, is quite a different matter, and that is the course the Council is taking. A number of the Council have had an interview with one of the plate-makers. The explanations given for the necessity for the rise are not entirely convincing as to amount of the advance. Each other firm is being invited to meet a deputation, so that we may be in possession of all the facts, and so be in a position to form an opinion as to the justification for the amount of the rise. The information gained will be communicated to our members, and they will be advised as to the opinion of the Council in due course.

A. Mackie, Hon. Sec.,
The Professional Photographers' Association.

Albany Street, N.W., Sept. 16, 1918.

To the Editors.

Gentlemen,—"Old Photographer" has written the most interesting letter that has appeared in your pages for weeks. It is a model of the art of gentle ridicule and wordological suggestion. Well may he smile about the "petty tradesmanesque" letters that so often appear in your paper, dragging professional photography down almost to the mental level of labour. Much of the correspondence in the "B.J." is of a grousing, faint-hearted, suspicious "S.O.S." sort.

Also, I would plead, let writers remember that this grand old paper we all read, and that they write their belliakes to, is read all over the world, and stands for British professional photography before the Allied nations.

There is another point. Some of the anti-platemaker correspondence we have read has a very queer look. I do not like that look. I suggest it is propagandic stuff. I point to the letter of "Thos. Lyons," in which he repeats almost word for word the claims made by some Bolshevist-minded concern that was going to build up a new era, if people would send enough five-bobs for shares, in which era we should be able to walk round our own plate factory and draw the profits on our own plates. Well, the bubble that Mr. Lyons burst on us said nothing about the South Seas nor any new era or anything. It claimed such innocency about such matters that it got you to print a two-line reply at the bottom advertising or stating that a firm, I forget its name, was already in existence. And yet Mr. Lyons used the very words of the advertisements of it in his simple-Simon-sounding letter!

Next, I point a stiff forefinger right at the letter signed "Archer Clarke" last week. Although he writes from a plate-company address, he begs your readers to tell him, if they know, where he can buy cheaper glass. What on earth do professionals and amateurs know about glass markets that a plate-maker should have to go to them for his information?—I am, Gentlemen, yours truly,

"Piccolo."

To the Editors.

Gentlemen—The action of the plate manufacturers has certainly aroused photographers from the peaceful lethargy into which they had fallen, if the correspondence in your columns can be regarded as evidence. Unfortunately, however, the letters rather remind [illegible] of the present strength of whisky, inasmuch as you can consume a lot of them without getting "forrader." The most hopeful solution of the problem is certainly contained in the existence of the P.P.A., and if only all the photographers in the kingdom immediately became members, a long step would have been taken in the right direction. It would strengthen the organisation wonderfully, especially if the subscription was raised to a guinea—even then a paltry sum for the benefits to be obtained. In my opinion the P.P.A. officers for the last nine years are owed a generous measure of thanks from the profession generally, if only for the assistance they are able to render us now at the present crisis, and during the many years of effort to improve our status, with no other reward than the knowledge of having proved helpful. In combined action such as could then be obtained something really useful might be evolved. But this result can only be achieved by every photographer becoming a member, and only members should be entitled to the benefits. What we want is a long pull, a strong pull, and a pull altogether. In our manufacturers we have a perfect business combine, and it needs a perfect organisation on our side to keep the balance true. It ought not to be possible for them, without warning or explanation of any kind, to dump autocratic terms upon their customers. In almost every commercial undertaking, when drastic steps are contemplated, usually a consultation takes place between the maker and the consumer. And it ought to be so with us. A shortage of glass might justify a demand for a return of 75 per cent of negatives, but with a list of manufacturers' sizes before [illegible], ranging from $2\frac{1}{8}$ x $1\frac{3}{4}$ to 36 x 24, and numbering, with Continental sizes, some seventy-five different measurements, one might question, under the circumstances, whether many of the varieties could not be scrapped in order to supplement the more popular sizes, and release us from the obligation imposed in our [illegible] purchases. A powerful, determined P.P.A. might debate the point with them to some purpose.—Yours truly,

G. H. Echart.

155 High Street, Clapham, S.W.4, Sept 12.

STRIPPING FILM AND PLATES.

To the Editors.

Gentlemen,—I have been greatly interested in the correspondence relative to the present prices of photographic plates, the suggestions as to substitutes for glass, and your "Ex Cathedra" comments under the heading "Pellicular Negatives."

May I take the liberty of correcting what appears to be an error in these comments regarding films on paper supports, not having been altogether successful, and attributing this to the fact that they could not be stripped dry. Personally, as an amateur, I used with much satisfaction and success, some fifteen years ago, a stripping negative film, on a paper support, manufactured by Messrs. Wellington, which certainly had, together with other advantages, the feature of stripping dry, and also when stripped, of affording a matt surface on one side suitable for retouching purposes.

I do not know the particular means of the profession with regard to films or plates, but I have never been able to discover a satisfactory reason for the discontinuance of the manufacture of such films, which, for my requirements, at any rate, were preferable to plates, and that at a time when the latter were low in price.

Leaving out the question of lower cost at the present price of glass, and, presumably, celluloid, it is difficult to understand the attitude of manufacturers in not moving more promptly with a substitute for a glass base. The manufacture of stripping films might involve the makers in some capital outlay in connection with alterations to plant, though, in the case I have cited, this could not have been a serious factor, or, at any rate, if the investment was good enough then, it should be much better now. Further, on this point, there is now on the market a stripping film on a paper support for positive work, and why not for negative?

Rapid negative paper of a very satisfactory kind was also obtainable prior to the outbreak of war, but I cannot find that it is obtainable now.—Yours faithfully,

Ambleside, September 14. H. Ashworth.

PLATE PRICES AND DISCOUNTS.

To the Editors.

Gentlemen,—I notice in your report of the proceedings of the Society of Master Photographers (Lancashire and District) that one of the speakers stated that "the former plate ring, formed about fifteen years ago, tried to dictate terms, but without success," a most misleading statement, and particularly harmful at the moment as suggesting that photographers effectually dealt with the matter then, and can as effectually deal with the present difficulty. The facts are that the Association of Manufacturers of Plates and Paper (A.M.P.P.) was established in 1897, and issued its first notice dictating the terms of discount on plates and paper to photographers in the opening of that year. Those terms were in full force certainly up to 1903, that is for six years, and all photographers, with the exception of the very few who had been clever enough to devise means of evading the regulations, were subject to them, until the collapse came some time later.

The conditions were entirely different from the present ones. The "ring" consisted of about fifteen manufacturers, not all of them plate makers. There were several plate makers not in the ring, and there was free importation from abroad. The ring regulations provide a sliding scale of discounts according to quality, but the list price of plates was not altered. One particularly objectionable feature was that the right of the professional photographer to a discount because of his being a professional photographer was not recognised; and, apart from the injustice of penalising the little photographer because he was little, the system created business difficulties which need not be particularised.

Early in its career the P.P.A. took up the matter, and sent a deputation to the A.M.P.P. I understand that the deputation was received most courteously, but their request for more favourable terms met with an emphatic refusal. The frontal attack thus failed, but the advice the P.P.A. gave those of their members who applied to them was strategically sound and quite practical.

This, I have good reason to know, for I asked for it and availed myself of it; but it must be recognised that the circumstances of the present case are quite different. Then, the ring was not a complete circle. There were gaps in its circumference. The regulations were arbitrary and unjustified; in proof whereof, after the ring collapsed its members freely gave discounts to all professional photographers greatly in excess of any heard of up to then, and still prospered exceedingly. But now the ring is complete; all the platemakers are in it, and no plates are obtainable except from one or other of its members. That no one in what was presumably a large meeting was able to correct the airy, irresponsible, and inaccurate statement I have quoted was unfortunate. If left uncontradicted, it is likely to leave the impression that those who are endeavouring to obtain higher terms for us have quite an easy task, and all they have to do is to proceed upon the lines, it is alleged, were successful before.

H. S.

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Hon. Secretary, 5a, Pall Mall East, S.W.

October 14 to November 30.—Royal Photographic Society. Entries close (carrier) September 20; (hand) September 21. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

Women Lens-Makers Wanted.—Prism binoculars and sighting and [illegible] small telescopes are now made in this country on a scale which would have been considered impossible in 1913. On this supply largely depends the sighting of the U-boats and the safety of our ships. Women workers are still needed for the manufacture of lenses and prisms. They will receive instruction at the Northampton Polytechnic Institute, Clerkenwell, with maintenance during a course of from six to sixteen weeks. Definite positions in factories in the Metropolitan area are assured to trained students. Intelligent women between the ages of sixteen and thirty, not already engaged on war work, are asked to apply for training to the Director, Optical Munitions Training School, Northampton Polytechnic Institute, 280, St. John Street, London, E.C.1.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

W. E. S.—The book you name is of very little value, and can frequently be picked up for a shilling or so from a second-hand bookseller. Probably the one you have in mind is Hunt's "Researches on Light," which latter is of some value.

G. S. W.—There are so many restrictions at present in regard to outdoor photography that you had better make personal application at your local police-station for a permit book, stating the particular district in which you wish to take photographs.

F. H.—Nos. 1, 2, and 4 are lenses suitable for quarter-plate cameras, but of no particular reputation as regards any of them. We should say the second-hand value of Nos. 1 and 4 is, say, 10s. each. No. 2 is, perhaps, worth a pound. We cannot put a price on the No. 3 lens from the particulars you send.

Changing Bromide into P.O.P.—I have a quantity of faulty bromide paper and cards, and I shall be much obliged if you can suggest a method of converting this into a rough P.O.P. suitable for rough proofs. I have tried a "salting" bath of amm. chloride, but this does not give a dark enough image.—E. T.

So far as we know, there is no practical way of changing bromide paper into P.O.P.

D. R. H.—The deposit is what is commonly known as "stress mark," and is common with some kinds of glossy bromide paper. It is due to the paper having been rubbed either before or during development. As a rule, it can be rubbed off with cotton-wool while the prints are wet, but if this does not answer, a very weak ferricyanide reducer applied in the same way will move it. Rubbing with methylated spirit will remove it from dry prints.

D. W.—1. You do not say how many plates you wish to develop at once. If only six, the Kodak or Standa tanks are good, but for twelve to fifty at a time you will want a professional pattern, which you can get from Messrs. Griffins, Kingsway, or G. S. Moore, 69, Denmark Hill, Camberwell, S.E. 2. Pyro-soda can be used in a tank if diluted with a 3 per cent. solution of sulphite of soda instead of plain water; but metol-hydroquinone, or metol alone are usually employed.

S. W. F.—1. Yes, if you are a good judge of apparatus. 2. If you have no experience, the reflex is best. 3. You must focus by scale, after learning to judge distances. 4. Not if of British make. 5. Anschutz shutters can be repaired here, but it is difficult to get repairs done at the present time. You might try Messrs. H. T. Ball and Co., 54, Berwick Street, Oxford Street, W.1. 6. On some subjects, but not for rapid work, unless you have a Multi-speed. 7. We cannot recommend cameras by name.

W. B.—There is considerable difficulty in obtaining cinema apparatus just now, since none is being made, and there is a great demand for camp and hospital use. So far as we know, there is none made to work with gas, but Pathé Frères make one which generates its own electric light; they also hire out films. You might write them at 84, Wardour Street, W.1. If you have no electric current, no doubt the best substitute is the oxy-acetylene lamp, price-list of which you can get from Messrs. Newton and Co., 72, Wigmore Street, London, W.1.

H. G. K.—1. The light of the mercury-vapour lamp is very soft and not so well adapted for use by reflection as that of the half-watt. 2. The mercury-vapour tube emits very little heat. 3. Less current is used with mercury-vapour. 4. The lamps, we believe, are guaranteed for 1,000 hours, and if they do not last this time any balance is credited off the cost of a new tube. They can be used in any position. Most people use them in a vertical position behind a ground-glass screen, which is fairly close to the negative. This arrangement is getting very popular in America. 5. For particulars you should write to the Westinghouse, Cooper-Hewitt Company, 80, York Road, King's Cross, London, N.1, mentioning your voltage.

Flat-Working Plates.—I have a large stock of unused plates I wish to use, plates about seven years old. I have tried a few, but find they give flat results. Have also tried bromide, but find I get the same result. Can you give me a formula so that I may be able to use same. I don't mind if it will reduce the speed as long as I can use them up.—E. G.

A method is to bath for fifteen minutes in: Potass. bichromate, $\frac{1}{4}$ oz.; ammonium bromide, $\frac{1}{4}$ oz.; water, 20 ozs. Then washing for thirty minutes, wiping with cotton wool or drying—of course, all in the dark or in ruby light. If your plates have not "gone off" badly, perhaps a hard-working developer, such as the hydroquinone-caustic, such as the second on page 354 of the Almanac, would serve your purpose.

Commercial & Legal Intelligence.

Notice is given that the names of the Acme Tone Engraving Company, Ltd., and the Fine Art Securities Corporation, Ltd., have been struck off the Register of Joint Stock Companies, and are dissolved.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully and correctly prepaid, senders of line announcements are asked to bear in mind this revised tariff. They will thus save themselves delay in the publication of their announcements.

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Advertisements are not accepted over the telephone.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH

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SUMMARY.

Every photographer is concerned with making the most of daylight now that autumn is with us. Hints on doing this, and incidentally improving the appearance of the studio, are the basis of an article on page 434.

Mr. F. C. Tilney, on page 435, gives his impressions of the exhibits now on view at the London Salon. In paying tribute to the quality of American work to be seen there, in quantity which this year is great in comparison with that of British workers, he finds that the general standard of pictorial photography is becoming increasingly higher.

In the concluding portion of the paper before the Royal Photographic Society, Mr. F. W. T. Krohn, as the result of his observations on the variations occurring in the sensitometric measurement of plate speeds, comes to the conclusion that for practical purposes it would be sufficient to rate a plate for speed by placing it in one or other of a series of groups, each designated by a mean H. and D. number. (P. 437.)

A possible explanation of spasmodic instances of staining in the development of bromide papers is suggested by a recent experience of ours, which forms the subject of a paragraph. (P. 433.)

The Italian experimenter, Professor R. Namias, has recently recommended the use of calcium polysulphide made by boiling flowers of sulphur in milk of lime as a reliable but slow single solution sepia toner. (P. 434.)

Equal dryness of the print and the mounting paper or board is one of the precautions which cannot be sufficiently impressed upon the inexperienced in the use of the dry-mounting process, inasmuch as its neglect is the main cause of an unsightly edging of tissue around the print. (P. 433.)

At a Council meeting of the P.P.A., held on September 13, further action with regard to plate prices was reported and other matters discussed. (P. 441.)

A communication from the Secretary of the P.P.A., giving particulars of proceedings taken to secure equable treatment of photographers under the Luxury Tax scheme is printed on page 438.

Further exemption from military service has been granted to certain classes of photographic workers, dating from the 26th inst. (P. 443.)

A modified form of rotary machine for printing from intaglio engraved plates which are temporarily attached to a cylinder, the special point of which is the creation of a continuous surface without gaps in which ink can accumulate, is described under "Photo-Mechanical Notes" on page 439.

Letters on mechanical retouching and an all-round increase in charges for photographs will be found in the correspondence column on page 443.

EX CATHEDRA.

Development Papers An Experience. During the war there is an almost universal use of development papers, and naturally photographers are eager to glean all the information that they can about them with a view to obtaining the best results, which fact tempts us to state the following small experience of our own. A number of exposed prints were to be developed. The first two came up splendidly and were of first-class quality, but the next began to stain before the image was strong enough to enable the print to be removed from the solution, though the latter was not nearly exhausted or showed any slowness. However, the solution was thrown away and a fresh lot taken, which worked very well with the first print; but with the next, the same staining action occurred as in the preceding case. Happening to notice which prints were spoiled and noticing that they were from the same negative and upon the same grade of paper, we were enabled to hit upon the cause of the trouble Two well-known grades of paper were being used, each by a different maker, and it was when the spoiled print was placed in the solution *after* the print on the other grade of paper that the stains occurred. Apparently something in the composition of one maker's paper brought about the effect described when the following print was upon a different paper. A careful test with the two papers, again using fresh solution, showed exactly the same result as in the previous cases, though when developed in separate solutions each paper gave first-class prints. Possibly, owing to war-time conditions, emulsions have had to be altered or modified in some degree. At any rate, photographers will do well to be on their guard in respect to possibilities of this kind.

* * *

Faults in Dry-mounting. Apart from the precautions which are obvious, such as accurate trimming, proper temperature of the press, the chief source of defective results in dry-mounting is dampness of the prints. It is, perhaps, not clearly recognised by less experienced users of the process that a print which has more or less moisture contracts to an appreciable extent when subjected to the heat of the press, whereas the adhesive tissue, which by its nature does not absorb moisture, remains unaltered in size. Hence it can happen that this difference may result in a narrow, but unsightly, band of bare tissue round the mounted print, or perhaps only on two sides of it. In the case of gelatine prints, dampness, in conjunction with a rather higher temperature of the press than is necessary, may cause softening or melting of the print enough to spoil the work altogether, through adhesion of patches of the print to the mounting plate. The preventive of these faults consists in straightening out the prints as taken from the drying racks, when the moisture in the print from the slightly moist air is sufficient to prevent the gelatine surface from cracking. They may then be laid together in a warm, dry place, not tightly pressed, which would prevent perfect drying, nor yet laid loosely, when they would again curl up and be troublesome. One means is to roll them, face out, around a pasteboard tube, and to secure them with one or two slack rubber bands. An hour or two in this condition should be enough to secure perfect dryness, after which, with attention to the temperature of the press, neither of the defects alluded to above should be evidenced in any prints.

* * *

Polysulphide Toning. Reference is made in the "Bulletin" of the French Photographic Society to a contribution to the methods of single solution sepia toning such as we recently reviewed in two leading articles. Professor Namias reports that in his experience an effective, though slow, toning solution consists of calcium polysulphide, obtained by boiling sulphur in milk of lime. About eight parts of quicklime are mixed with twenty parts of water, and six parts of flowers of sulphur added. The mixture is kept on the boil for half an hour, whilst making small additions of hot water to compensate for that evaporated. After cooling and filtering, the whole is diluted to 100 parts of water. It is stated that the toning effect is enhanced by immersion of the toned prints, as they come from the polysulphide solution, in a weak bath of acetic acid. If, as is assumed, the acid decomposes any polysulphide left in the films, we can scarcely regard it as a desirable supplement to the process in the event of traces of hypo being also present in the print.

STUDIO BLINDS.

With the approach of autumn we begin to realise that we have to commence "daylight saving" in reality, for every day reveals not only a shorter duration of useful light but a decided decrease in intensity. Moreover, we are rationed in artificial light, and must not switch on the current to supplement the defaulting solar rays. The surest and easiest way to economise in the desired direction is to see that we have clean windows and clean blinds. It is easy enough to clean glass if it is accessible, so that we need say no more about that. But when we come to deal with blinds it is quite another matter: many, if not most, studios are fitted with spring roller blinds, and these are usually allowed to fall into the lowest depths of degradation before they are attended to. In fact, they are often so stained and rotted that cleaning is out of the question, and replacement is the only possible course. Even if the material can be cleaned it is desirable to have it replaced by new, as this can be done in a few hours, while washing and redressing the old blinds would mean leaving the studio blindless for several days. After the new material is up the old may be renovated ready to take another spell of duty next year. It may be worth mentioning that the ordinary laundry cannot handle roller-blind material successfully, as special finishing is necessary if the blind is ever to roll up evenly again without going into a multitude of unsightly creases or persistently running tightly on one edge and loose on the other, so that the laths always look askew. As a rule, the ordinary white blind cloth is too heavy and obstructs too much light; if this material be chosen the thinnest sample should be selected. A stout tracing cloth makes a very satisfactory blind while it lasts, but it soon becomes brittle, and once it begins to tear its usefulness soon departs. However, it is cheap, and can be renewed every year if needed. The dark blinds give little trouble; all they require is thoroughly dusting, and repairing with patches of thin dark material seccotined on where any holes or tears have started. This will often be found better than sewing, especially when the material is too rotten to hold stitches. A touch of oil on the roller spindles and any pulleys over which the cords run conduces to smooth working and the durability of the fittings.

If any difficulty arises in getting roller blinds renovated it is worth trying the experiment of discarding them temporarily in favour of the simpler system of festoon curtains, which can be installed throughout at a very small cost. The design of these is so well known that it is not necessary to repeat it here, but some details of construction may be acceptable. The wires should not be too thick: one-sixteenth of an inch is ample, for thicker wires are difficult to strain, and are liable to sag of their own weight. Galvanised iron is the best material; brass quickly corrodes, becomes rough so that the rings do not run smoothly, and quickly perishes if exposed to gas fumes. The rings may be galvanised or brass, and should be large enough to pass over the straining bolts at the ends of the wire; this saves much time when replacing. The four rows of wire must not all be in the same plane: the first, third, and fourth should be in a line, but the second should be three or four inches lower. This line carries the top of the second row of curtains, and if in line with the others allows the curtains to hang against each other, so that one row cannot be adjusted without moving the other more or less. Select a sufficiently thick material for the dark blinds; a good sateen or casement cloth in dark blue, green, or brown answers well. What is known as Bolton sheeting can be had in dark colours; it is a heavy variety of casement cloth, and answers admirably. For the white blinds nainsook, jaconet, or madapolam, which are all very much alike, answer well, and wash easily. Ordinary calico is too thick, and picks up dirt much more quickly than the foregoing materials. It is well not to be sparing in the quantity of material used. As a rule, it will be found advisable to have the dark curtains full enough to cover the glass entirely when extended, and even then there should be slight fullness. Between the two dark sections on the same wires are the white curtains, and these should be wide enough to cover half of the glass when extended. With this arrangement either end of the studio can be used at will. The side blinds should be in two rows, except when the side light is very shallow. If the glass commences at four and a-half feet from the floor one row will usually suffice; the proportions given for the top blinds should also be adopted for the side. It is a good plan to have the dark curtains fastened at either end of the studio with drawing pins or tacks, so that no slit is left to admit light over the sitter's head.

A set of curtains carefully fitted on the foregoing lines should be practically light-tight, and should answer the purpose of Zeppelin blinds. If the white blinds when folded close together allow too much light to pass, a strip of dark material must be fitted with hooks so that it can be adjusted to cover the doubtful space.

A certain number of studios suffer from the defect of being too lofty, the blinds being therefore too far from the sitter, and the control of the lighting difficult. To obviate this it has been recommended to fit the blinds upon a movable frame; in fact, as Mr. Robert Slingsby, the originator of the idea, said, "to build a studio inside the studio." This is, however, a wasteful plan; it detracts from freedom of movement, and it is quite out of keeping with the modern idea of a studio interior, which is to be as much like an ordinary living-room as possible. In such studios it is a much better plan to bring the blind curtains to a lower level, so that the light-control is nearer the sitter, and while doing this it is advisable to keep the line of curtains flatter than the pitch of the roof. As a general rule the side light should not be lowered, but the top curtains, starting from the side, should not be allowed to go soaring into the lofty roof. It is worth while making a special rod to manipulate festoon curtains, and for this we have found a bamboo cane fitted with a two-inch bung or ball of cork at the end very useful. An unprotected stick is likely to tear the curtains, and does not have the necessary gripping power when sliding them along.

THE LONDON SALON.

A PERSONAL IMPRESSION.

If there is one thing that strikes the customary visitor more than another at the London Salon it is that the Americans "have it." One is roused to admiration time after time before prints which turn out on reference to have been sent from the great continent. Why many of the staunch supporters in this country should be conspicuous by their absence has not been explained; but it is not to the advantage of "the old gang," as a Carmelite would say, that the present show is so excellent in spite of its lack of home support.

It is possible that amongst the huge stacks of unhung prints the British contingent is quite fully represented. If so, that fact speaks for itself; and it behoves us to find a reason for the failure of British photographers to do work which can win places of honour in a British show organised by British experts.

A charitable theory would be that America is a large place, and the British Isles a comparatively small one; that every photographer of any note is anxious to be represented in London; that a small proportion of enthusiasts in America's millions would be enough to swamp a larger proportion of our enthusiasts here.

Personally, I am not sorry that it is so; for American work has always appeared to me to be virile, trenchant, and unsophisticated; whilst in later years it has also been less impudent than our own. British work has certain very obvious characteristics. It is conscientious, but with a sort of sheep-like conformity to safe custom. When it kicks over the traces (which I admit is not a custom of sheep) it does so without rhyme or reason. Its developments do not seem to be on legitimate lines, but are simply a mad change of plan. It takes a very strong man to work out his salvation by dogged perseverance on prearranged lines. A few such strong men are with us still doing slightly finer work every year. The less strong are always in a hurry, and ready to try any passing "stunt" that will whisk them into popularity. A favourite resource is to imitate the American freshness of view; but that is a thing to possess, not to imitate.

The American is really a very simple person. His method of approach is that of a guileless child. That is why things that ruffle our sense of propriety in American work are attributed in the first place to American advertising proclivities; but in the end turn out to be the honest efforts of quiet-spoken and modest enthusiasts.

The picture that has stirred me most, and which remains most vividly and joyfully in my mind's eye, is Louis Fleckenstein's glorious print which he calls a "War Widow." I do not like the title. The lady may be a war widow, but what's that to do with it? Her apparel may be modern "widow's weeds," but what's that to do with it either? This portrait has no connection with war at all, and the very word is a touch of topical canker on Mr. Fleckenstein's part. But, apart from that, it seems to me that this picture is one that a searcher after beautiful things for their own sake would certainly covet. It would take and hold its place in a collection of choice Rembrandt prints. First of all, it is a masterly specimen of photography, clear and strong throughout; next it is a well-conceived and finely achieved design in light and shade; again, it is convincingly naturalistic and free from any kind of freak effect; lastly, it is a charming subject in itself. Its author has other works commanding attention; but this one is sufficient for his reputation.

Amateur pictorial photography has many ideals. The production of works of art is only one of them, although perhaps the foremost. But it is not fair to judge the whole output by the gauge of that one ideal alone. Some photographers aim at the interest of the topical event. Many strive after the interest lying in the curious and the bizarre. Others have a poster ideal, and others again show an ambition to produce the sort of thing that the editor of an illustrated weekly is on the look-out for—something that will evoke a "What ho!" from a reader. It is in the first category, that of works of an art value, that Mr. Fleckenstein's print is to be classed, and next to it should come the admirable "Mother and Baby" (41), by Alice Broughton. The claims of this are purely artistic. They are precisely those of a beautiful drawing—art for art's sake. I do not imply that the mother and her child at the breast are not in themselves lovely to look upon and interesting from a standpoint of sentiment. But the design in itself is admirable, the composition extremely happy, the liney quality rather unusual in camera work and yet quite legitimately arrived at. The print has, in fact, more of the qualities of a Holbein drawing than of the average photograph of the sleepy toned variety.

In this connection reference might also be made to two prints by A. T. Burgess, "Warwick" (200) and "At the Top of the Hill" (201). These have the particular attractions of mezzotint and line etching respectively. The latter is the finer. Its subject, a clump of sturdy trees, is exactly suited to the style and method which Mr. Burgess so cleverly simulates. Photographers have often been blamed for imitating drawings and engravings. When they have done so wantonly and clumsily they have deserved all they got; but when they have produced a thing of beauty they are justified.

Side by side with this assimilation of art influences, which prompts photographers to note and emulate the æsthetic qualities of certain methods belonging to graphic art, there is another evidence of welcome development: that is, the undoubted increase in a love and understanding of natural effect. Such an example as the modest-looking but thoroughly felt essay in nature study as E. Hazell's "Blizzard" (59) is a hopeful sign. It is not in itself eminently pictorial, but because it is a development that must lead to a good end, it is infinitely to be preferred to the thoughtless knocking-up of pictures by inventing sunsets and by faking moons—a practice that has a bad tendency. Near the "Blizzard" hangs "The White Cottage at Dusk" (63), by C. W. Rodmell, another highly interesting effort to render the most fascinating natural effect of a full moon at sundown. Of course, Mr. Rodmell had almost a hopeless task without colour; but the tone-values of the scene he has caught admirably, the near side of the cottage being in the full flood of the fading glow of the western sky, whilst the rising moon dominates by its brightness the whole scene. This has evidently been first admired and felt by the photographer. Again there is a sensitiveness to natural beauty in W. G. Fitz's "Philadelphia" (39), a street scene with a splendid light effect amongst the towers of large buildings, one of which just obscures the sun.

These things display a feeling touch. Their treatment at the photographer's hands helps them to their best pictorial effect. Other equally truthful and Nature-prompted efforts are severely photographic, and these have no such help to rely upon. Two excellent sea scenes come into this category. One is the "Rising Moon" (35) by G. A. Clarke, and the other "A Summer Sea" (332). The truth in these Nature studies is quite satisfying and educative. It is most interesting, for example, to see how the slope of the sand in Mr. Eickemeyer's work causes a deflection in the straight path of reflection of the moon across the water.

The class of picture which might be described as topical is not so general as might be expected. The leading example is "The Gate of Good-Bye" (58), by F. J. Mortimer. This strikes well the war note without harping on either the terrific or the mawkish. It shows a detachment of Tommies entering Victoria Station for entrainment. Pictorially it is very successful, the archway being a fine feature of the scene, which has bustle and life and is full of little incidents of interest. Mr. Mortimer's other effort in this class is "An Eye for an Eye; a Tooth for a Tooth" (5), and represents a boatload of poor wretches who have been torpedoed. We accept the title without seeing exactly how it applies, unless it is a general appeal to the spectator for reprisals. The print is an extremely clever piece of picture-making, and is sure to be popular. "The Liner's Escort" (356), by Engr.-Commander E. J. Mowlam, is another good topical subject; and Messrs. S. Bridgen and Cyril W. Rodmell also contribute to this class of subject.

Mr. Bridgen likewise scores in the landscape class, which, by the way, is not the strongest section of work this year. His "Misty Morning" (324) is a fine rendering of natural effect. Tall elms, whose boughs saturated and drooping make a lovely pattern, form the foreground. The retiring planes, which the mist accentuates, have each their interest, and the mood of the subject is perfectly given. Another excellent picture is sent by Bertram Cox, who in "Brandon Bridge" (237) is true to his past successes in the waterways of quiet old towns. The leading feature of Mr. Cox's works of this kind is their power of telling strongly at a little distance. He does not indulge in strong contrasts; but nevertheless his tones appear to be much more diversified than they are. Grey though the present print is, there is no feeling of flatness. The water shimmers with light; the near trees are deeply in shade, and everything looks true and seductive. On the other hand, a pastmaster of picture-making like Alex. Keighley, pitches his work in a much lower key, and although he uses a longer scale than Mr. Cox, does not secure so much relief, because he does not go deep enough in his dark parts. "Larch and Mountain" (76) and "The City Gate" (77) fine as they are, do not seem to have any "snap," viewed either near or close. In "The Angler" (79) this stopping short of the requisite depth of tone at certain parts results in a near boat, which is quite a large mass in the composition, and comes against the light, being no darker than the clouds of the sky, and a fine design therefore suffers from flatness. But Mr. Keighley is his best self in "Harvest Home" (74), a composition of great charm full of interesting incident. Here the planes are perfectly kept, and the result is bright and convincing.

Right beneath these works hangs T. B. Blows' impressive "Mosque, Cordoba" (78), a print of exceptional strength and quality in its shadows. It is in principle similar to Mrs. Ralli's "Lace Makers." It accepts sunshine and shade as light and dark necessarily, and the effect is stimulating. It is rather astonishing that our ideas in landscape photography are, after all these years, still sticking in the morass of stodgy flatness. The fault has become a tradition of English work. Much of this unfortunate habit is due to the tints and the papers employed, and to a want of pluck in the management of enlargements.

The American workers are much bolder. W. H. Rabe's "Nocturne" (20) is a keen-toned architectural idyll, where columns, light and dark, are reflected in the still waters of a lake. His "Columns by Night" (71), poetic and mysterious as it is, has its full gamut of tone.

Architecture makes a great show this year in American hands. "The Altar" (89), by W. A. Hudson, is a splendid subject, full of romance and picturesqueness, yet it is only a choicely chosen corner of a Californian mission. "The Capitol" (136), by E. M. Pratt, is another good work, grandly composed. The dome, brightly lit, is relieved by the darks of near trees, and there is no sophisticated "good taste" to tone everything down to a middle strength.

But it is nice to welcome a good piece of architectural work from an Englishman also. S. W. Shore's "Lothbury" (185) is an admirable selection. He has chosen his subject with such art that all the familiarity which might breed contempt in a Londoner is eliminated, and one sees fine architectural features, freshness, and picturesqueness such as one would expect in some interesting corner of an old continental town. Mr. Shore's tones are effective: that's the main secret. John H. Anderson is another British photographer who sends work of which we may be proud. He, too, has the pictorial sense well cultivated. "In an East Coast Harbour" (9), "Dordrecht" (64), and four other examples, all show a love of rich deep tones and a strong feeling for design. Mr. Anderson enjoys the tracery of ships' rigging, backed by the towers and walls of towns and the glitter of water. Yet even he is at times disposed to cover down what should be light passages in an evident quest for harmony and quietude in the tonal scheme.

The portraits are already treated of in another article, but I must say a word or two about some outstanding figure work. There are, as usual, several pictures, including the nude figure as an accessory. Not all are good, but two by Ernest Williams certainly deserve a recommendation. They are "The Fairy of the Hills" (56) and "Summer's Sunlight" (62). In these the figure is treated purely as an incident in the landscape, which in both cases is sunny and romantic in feeling. The spontaneity and fitness of the figures to their setting are remarkable points. The same method is employed by Angus Basil in his "Early Morning" (111), a wood scene where a nude figure shares the sun-flecks with the boles of the trees. In "The Outcast" (60) a gloomy subject, by Ford Stirling, and in "Nude Study" (54), by A. F. Kales, the figure is the principal thing and the setting a mere background. Both these works are successful, though lacking in pictorial charm.

Richard Polak continues to practice his imitations of old Dutch masters. To my mind the best here is "The Pearl Necklace" (157). It is the most happy in composition, and the quality in the folds of the lady's skirt is admirable, recalling similar beauties in the prototypes of these pictures. There is a window in this which from point of view of design and verisimilitude is excellent, but it scarcely carries conviction as a window. Possibly Mr. Polak did not intend that it should. Metzu knew nothing about halation; or if he did he didn't try to paint it, so Mr. Polak's rather hard window is quite in order in that respect. In the management of his models and the *mise-en-scène* of his pictures Mr. Polak is still a marvel.

It is certain that pictorial photography by the amateur is now firmly established as a cult all the world over; and that it is developing from year to year. Every exhibition in recent times shows a higher general average, and in that we have much to be thankful for.

F. C. TILNEY.

THE MECHANISM OF DEVELOPMENT OF THE IMAGE IN A DRY PLATE NEGATIVE.

(A paper read before the Royal Photographic Society.)

(*Continued from page* 428.)

[Owing to the difficulty of reproducing a diagram so that it should be decipherable when printed, a portion of the paper is here omitted. —EDS. "B.J."]

In Fig. 6 are shown the curves for $\gamma = 1$ obtained when different quantities of potassium bromide have been added to the developer before the commencement of development.

The ratios of potassium bromide to 2 gms. of pyro were as follows:—

For	B.	C.	D.	E.	F.	G.
	⅛ gm.	¼ gm.	½ gm.	1 gm.	2 gms.	4 gms.

If the plans of development for these restrained developers are worked out, the effect of delay in development of the lower densities comes out strongly in the inertia curves. The great rate at which the inertia changes in the early stages is clearly indicated, and it is only when development factors of 1.5 to 1.7 and above are being reached that the differences in speed are no longer so marked. The full advantage of the use of potassium bromide is limited to a comparatively low range of development factors, but fortonately the most useful ones. Very little advantage, if any, is to be gained from the use of potassium bromide in cases of over-exposure if the addition is made after development has once set in. The addition must be made before development commences.

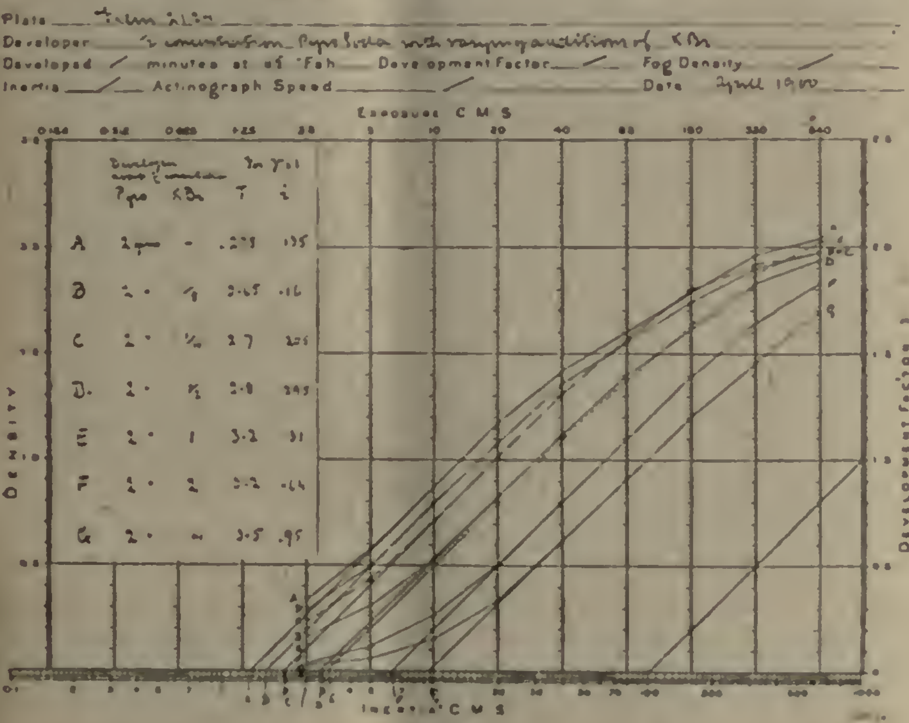


Fig. 6.

On again examining the curves in Fig. 6 it will be observed that the latitude of the plates gets somewhat increased with increase of potassium bromide. There is little doubt but that this is due to the fact that since we are here working with the fullest exposed portions of the plate, we are utilising the silver contents in the film to the fullest advantage.

The type seen in curves E, F and G (Fig. 6) is very like the "long range" double flexure type of curve that one gets with the best fast plates on the market. With these, however, the concave, or under-exposure portion of the curve, as a rule reaches fairly high densities before it merges gradually into the straight or correct exposure portion of the curve. The correct exposure portion is often very long for these plates, but in any case the transition into the convex or over-exposure portion of the curve is a gentle one, *i.e.*, the curve does not break away rapidly from the tangent.

By proper methods of emulsification the good qualities of the restrained development curves have been impressed upon these plates so that they can be developed with unrestrained developer, and thus full advantage can be taken of their high speed.

The type shown in curve A (Fig. 6), on the other hand, approximates in character to what one might call the "short range" double flexure type found in plates which are often very fast but do not possess the latitude and fine qualities exhibited by the former class of plates.

In the "short range" type of curve the concave portion merges into the straight portion at lower densities and the change is comparatively rapid. The straight portion of the curve is short and the change into the convex portion is pretty abrupt, and takes place before very high exposures are reached.

Richness of coating of course exerts a very considerable influence on the character of the curve, but there are other factors, namely, the irregularity or regularity of grain, and the size and the crystalline character of the silver haloid particles which also play a part.

I have come across emulsions giving the "short range" type of curve in a rather pronounced form in which, under the microscope, the silver haloid particles are seen to consist of crystals which are octahedra of the cubic system, Fig. 7—*b*; and cubes with truncated corners, Fig. 7—*a*. The latter, of course, is the normal form of crystallisation of the silver haloids.

In emulsions, on the other hand, which more often than not give the "long range" type of curve, the silver haloid crystals are found to have another and more interesting form. By considerably diluting the emulsion and warming the slips, the particles exhibit the "Brownian movement," and one is thus able to examine them under the microscope in all positions. It is this examination under varying positions that helps one to get a good idea of the crystalline shape, even of the smallest particles. It is not easy to determine the exact shape of these crystals even under high powers, but I am almost certain that Fig. 7—*d* is a correct representation. The crystals are lamellar and almost hexagonal, and are probably imperfectly developed octahedra such as one gets with chrome alum crystallised in a shallow dish. These hexagons exist singly, but also have a great tendency to group themselves into triangular or hexagonal figures—see Fig. 7, Nos. 2, 3, 4, and 5. In the former case the centre of the figure is one *corner* of a single hexagon, and round this point are grouped one or two rings of hexagonal crystals. In the latter case the centre of the figure is the *centre* of a single hexagon, and round this hexagon are grouped one or two rings of hexagonal crystals. Whether the crystals in these groups are in contact, as shown in No. 2, or in the manner shown in No. 2′, I do not know, for they are so small that observation is difficult; but I am inclined to think that the No. 2 method of grouping is the more probable one.

The long range type of curve frequently shows a very long period of under-exposure which then includes such high densities that the average user has to employ a great part of the under-exposure portion of the curve if he wants to obtain at all usable negatives. It is useless in such cases to give the true H. and D. speed of the plate: one has to estimate an approximate value which may amount to as much as double the true value. After all, the average user does not ask for a theoretically correct negative, but for one which will give him a satisfactory print from a pictorial point of view.

In the preceding I have given of the reasons for the opinion I have long held that it is useless to pretend that the H. and D. speed values marked on plate-boxes give more accurate and scientific indications of the capabilities of the plates than the older methods of speed indication did. They can be made to do so, but that is another story. As ordinarily given and used, they are not *less*, but also not *more* reliable, than the other forms of speed indication in vogue, and in everyday practice they are used in the same way. The H. and D. speed value on a plate box tells the user that if for the conditions which he is able to control and judge he gives the plate a certain exposure and then develops the negative according to certain instructions, he will obtain a satisfactory and useful negative from which he can make prints which will satisfy his artistic feelings. This is all he asks for and is all he gets. The negative *may be theoretically correct*, but is not necessarily so. *If* a theoretically correct negative is wanted, then the H. and D. method is the only one capable of giving one the necessary data, but these data depend on a number of factors which must be carefully defined. A few of these factors I have touched upon, but there are still quite a number of others which all have an influence on the true H. and D. speed value which must be employed under definite specified conditions if the theoretically perfect negative required is to be obtained.

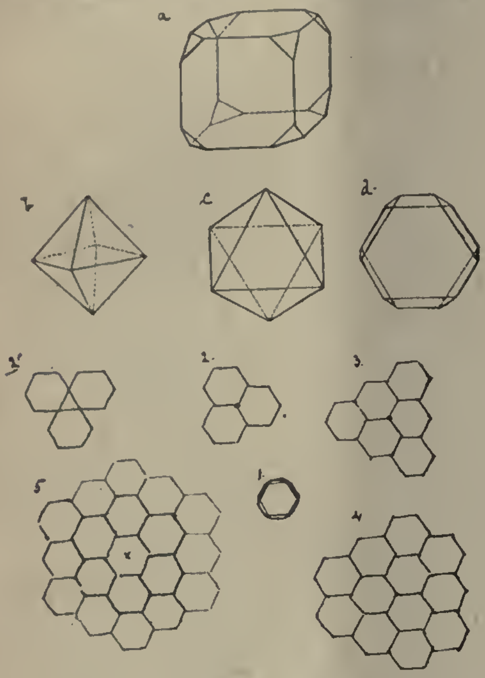


Fig. 7.

Personally, I consider that for everyday use the "Group Method" is the practical method of marking plates with H. and D. values. By this I mean that if for $\gamma=1$ the H. and D. value falls within a certain range of speed values constituting the group, the plate should be marked with the average H. and D. value of the group.

These H. and D. group values are what might be called the "practically useful" or "practical" H. and D. speed values.

The real value of the H. and D. method of testing plates does not lie in the *speed values* obtained, but in the fact that it is the only really scientific method which the manufacturer has at his command, by means of which he can learn almost all there is to learn about the capabilities of his coated emulsions. Used in this way, the method renders him invaluable assistance in his work and in his efforts to improve and perfect his products. The method still wants perfecting, and, above all, wants standardising, and perhaps some other time I may be permitted to draw attention to the numerous factors which must be standardised. This question of standardisation is one which I hope the Royal Photographic Society will seriously tackle in the not too distant future.

F. W. T. KROHN.

THE P.P.A. AND THE LUXURY TAX.

AFTER agreeing as to the principle of the Luxury Tax, Parliament appointed a Select Committee of the House to consider and report what articles ought to be classed as articles of luxury for the purpose of any Act of the present Session which may impose a duty on luxuries. Before proceeding to details, the Committee decided to take, as a basis for classification, the lists of a French Act of a similar nature already in force. Translations of these lists were accordingly printed and published by the Government Stationery Office and were available to the public. Invitations were issued to the various trades and other parties interested, and particularly to representative trade associations, to attend before the Committee and state their views as to the adjustment of the duty to the articles in which they were interested. In issuing their invitations, the British Photographic Manufacturers' Association and the Photographic Dealers' Association were included, but unfortunately the P.P.A. was overlooked, and it was not until it was too late to apply for a hearing that the fact that the Committee was taking evidence came to our notice, and we are indebted to the Secretary of the B.P.M. Association for having given us the information. The B.P.M. Association and the P.D. Association had jointly appointed Mr. Edgar Houghton, President of the former and a member of the Council of the latter, as their representative, and, on receiving the information referred to from the Secretary of the B.P.M.A., I had a conference with Mr. Houghton. This was on Friday, and his appointment with the Committee was on the following Tuesday. Saturday being *dies non*, there was no opportunity for our Council to meet and discuss details, and the only course was for me to deal at once with the case.

Mr. Houghton kindly undertook to include in his representation the P.P.A., and it may be pointed out that the interests of all branches of photographic industry are practically identical as far as this tax is concerned, and that the fact that the whole case was in the hands of an extremely able representative was a factor of strength, not of weakness.

We then discussed the details. Included among articles to be subject to duty, whatever the price, in the French list, appears photographic materials, etc. This, we agreed, should be opposed on the ground that material of any kind purchased for the purpose of manufacture could not logically be included among luxuries; moreover, it was the only material of the same nature included in the French list.

The only other item in the French list interesting to photographers was included among "articles subject to duty according to price," and herein appeared:—

> Photographs, portraits, exceeding in price, per doz., 40 francs.
> Photographs, enlargements, exceeding in price, each, 30 francs.

It was obvious that if the French scale was to be taken as a basis, it would be of no use asking for a limit to be fixed much higher than that of the French list, and we agreed to ask that the limit price be fixed for portraits at 42s. per doz., and for enlargements 30s. each. At the present rate of exchange that is rather more than 30 per cent. higher than the French limit.

Mr. Houghton duly appeared before the Committee, and that he made his points effectively is evidenced by the report of the Committee, which has now been published. The recommendations that affect photography are as follows:—

1. Nothing directly photographic is recommended for taxation irrespective of price. Among articles to be taxed if exceeding the specified price:—	
2. Etchings, engravings, photographs, photographic reproductions	21s.
3. Photographs, executed to order, at the rate per doz.	42s.
Enlargements of such photographs, each	30s.
4. Photographic cameras, each	15s.
Photographic accessories, per article	5s.

With regard to 1 and 2 no comment is necessary. In 3 it will be noticed that while the limit asked for by us, 42s. and 30s., have been fixed, the word portrait has been dropped, and the tax applied to all photographs. No. 4 sounds alarming, but as among the exemptions from taxation is included "any instrument or apparatus essential for the carrying on of any business, purchased for the sole use of the persons engaged in such business," and as a note explains that the above "is intended to cover such articles as the camera of the professional photographer," photographers have the satisfaction of knowing that the necessaries of their business are to remain free.

The unanticipated alteration of the basis from "portraits" to "photographs" having widened it so as to include photographs that appear to us in no sense luxuries, means were sought to obtain a reconsideration of the point, and, through the introduction of Mr Lang Sims, Mr. Davison Dalziel, M.P., a member of the Select Committee and Chairman of one of its Sub-committees, consented to receive a deputation of the Council to hear our views.

Our representation was that, whereas we accepted the fact that expensive portraiture was legitimately included among luxuries, photographs taken for commercial, technical, or scientific purposes could not justly be so included, instancing photographs for trade catalogues, photographs taken at various stages of a building operation, photographs taken as records of patterns or designs or to be used as guides in manufacturing processes, photographs made in aid of scientific research, etc. With this view Mr Dalziel expressed his entire concurrence, and promised to represent this aspect of the case to the proper authorities.

Other points which were raised, Mr. Dalziel explained, would be dealt with by the House of Commons itself, of which he was but a part. At the conclusion, Mr. Dalziel was thanked not only for his courtesy in receiving our deputation, but also for the sympathetic reception given to our representations. We left convinced that our objections would be duly considered, and that, as Mr. Dalziel pointed out, photographers were receiving as favourable treatment as we had any right to expect.

ALEXANDER MACKIE, Hon. Sec. P.P.A.

Photo-Mechanical Notes.

Rotary Intaglio Printing Machines.

A modified form of rotary printing machine for intaglio etched plates is described in a recent patent specification, No. 117,888, of February 9, 1918, granted to Mr. J. Ruddiman Johnston, 13, Mikawadai machi, Azabu ku, Tokyo, the invention being supplementary to that of patent No. 18,055, 1915, and relating only to means for wiping the inked plates. The description which follows is in the words of the patentee:—

The surface of the etched cylinder at present in use has, when printing is taking place, a coating of ink continuously applied to it by means of a roller, and as the cylinder continues its revolution the ink is removed from its surface by a thin steel scraper blade, and is left only in the etched portions. The sheet of paper to be printed is then brought by another cylinder and pressed against the etched surface from which it removes the ink lying in the etched parts, thus receiving its impression.

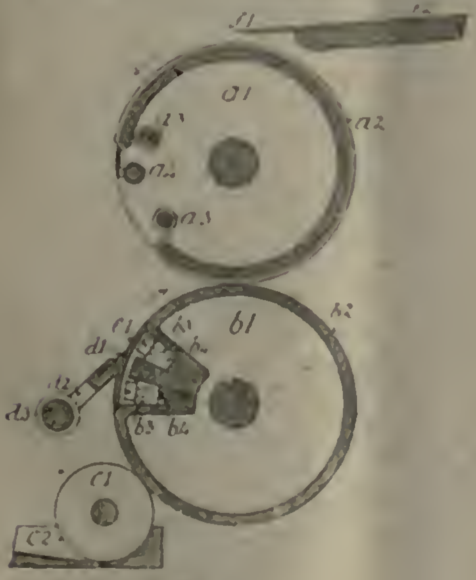


Fig. 1

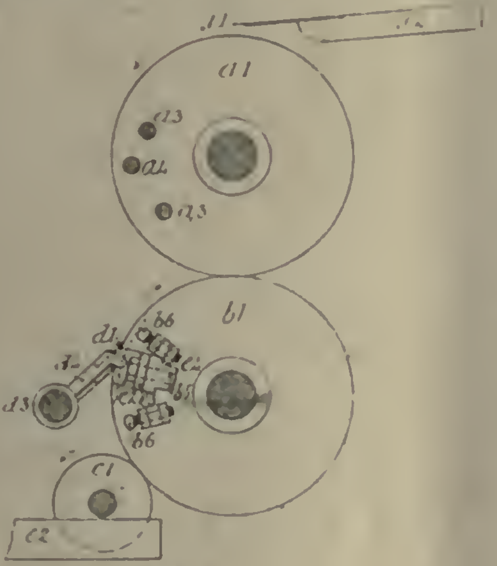


Fig. 2.

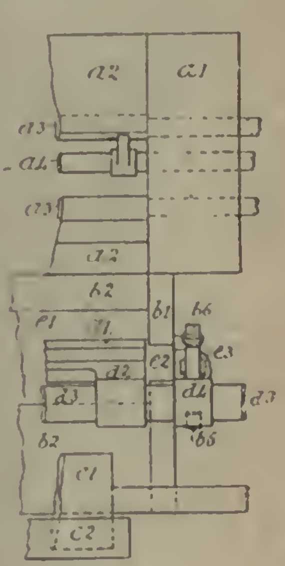


Fig. 3.

In the invention, about to be described, the method followed is exactly the same, the difference being that, as plates are used and their ends must be turned in so that they may be fastened to the cylinder, I provide a bridge plate for closing the interval between those ends, and thus obtain a cylinder with a continuous surface on which the inking roller and scraper can act as they do in the machines now in use.

In the drawings, Fig. 1 is a sectional end elevation of the impression and plate cylinders when sheets of paper are being printed, which shows how the ends of the etched plate are secured, and the position of the bridge plate. The drawing also shows the inking roller and the scraper blade. Fig. 2 is an end elevation of the outside ends of the same cylinders, this figure also showing how the bridge plate is fixed to the cylinder. There is also shown in it some parts for slightly raising the scraper blade at certain positions, as will be afterwards explained. Fig. 3 is a side elevation of Fig. 2. Fig. 4 shows in section how the plate can be fixed by a single wedge-shaped piece, and a small bridge plate used. This arrangement is adopted when a web of paper is used for the production of newspapers or periodicals and a small margin must only appear between any two copies of the printed sheets. Fig. 5 shows the outside of the cylinder shown in Fig. 4 and Fig. 6 is a side elevation of Fig. 5. Figs. 7, 8, and 9 show similar views to those shown in Figs. 4, 5, and 6 of an alternative method of fixing the ends of the plate and bridging the interval to that shown in these figures.

a^1 is the impression cylinder, its surface being almost entirely covered by the rubber blanket a^2, which is secured at its ends to the blanket rods a^3. a^4 is the shaft that carries the grippers which at the right time seize the end of the sheet f^1 lying on the feeding-board, which is partly shown at f^2.

c^1 is the inking roller which takes its supply of ink from the trough partly shown at c^2, in which it revolves. d^1 is the thin steel scraper blade carried by its holder d^2, which is supported by the shaft d^3. The blade is pressed against the surface of the plate by springs not shown in the drawings.

All these parts are well known, they being similar to those now in use.

The plate cylinder b^1 carries on the greater portion of its surface the thin etched plate b^2, the ends of which being pushed in at the sides of the wedge-shaped pieces b^3 are, when the bolts b^4 passing through these wedges and into the cylinder are screwed in, drawn inwards, thus stretching the plate tight over the surface of the cylinder. When this is taking place, the inking roller c^1 has been removed, and the scraper blade d^1 thrown back from the cylinder.

The bridge plate e^1 is now inserted, it fitting closely against the rounded edges of the etched plate, and its ends at e^2 fitting into the ends of the cylinder b^1. These ends terminate in projections e^3 through which the bolts e^4 pass into other projections b^6 from the ends of the cylinder b^1. As the bolts e^4 are tightened the bridge plate e^1 fits accurately against the ends of the etched plate b^3, so that the cylinder presents a continuous smooth surface of an equal radius.

As the scraper blade d^1 is thin and any injury to it would prevent it from efficiently cleaning the surface of the plate, the bridge plate e^1 must be kept polished, especially at its edges where these meet the etched plate. Should this be done, the following device will not be required, but if the edges of the bridge plate are likely to become roughened, then, to provide against any possible injury to the scraper blade, the latter can be slightly raised so that it will not touch the ends of the bridge plate.

To obtain this result; at the ends of the shaft d^3 of the scraper blade d^1, are fixed the pieces d^4 having rounded points as shown, and on the cylinder's ends are fixed adjustable bolts b^6, terminating in similar rounded ends. As the cylinder b^1 revolves in the direction of the arrow, the ends of the bolts b^6 will come alternately against the ends of the pieces d^4 and consequently turn to a very small extent the shaft d^3 to which the supports of the scraper blade are fixed. This action will very slightly raise the scraper blade d^1 so that it will not touch the edges of the bridge plate e^1.

The arrangement shown in Figs. 4, 5, and 6 is used when a web of paper is being printed, and is similar to that already described. When the ends of the etched plate are placed along both sides of the wedge-shaped piece b^3, and the bolts b^4 are tightened, the etched plate b^2 will be pulled tight round the surface of the cylinder b^1, and securely held. The small bridge piece e^1, which fits into the cylinder's ends at e^2, is then inserted, and fixed to the ends of the cylinder by the bolts e^4. To prevent the scraper blade being injured when it meets the edges of the bridge piece e^1, it is lifted as already described by pieces d^4 acting on the projections from the bar b^7, the ends of which terminate in adjustable bolts b^6 passing through eyepieces in the cylinder's ends.

In the arrangement shown in Figs. 1, 2, and 3, in which sheets are printed, any small quantity of ink that may lodge in the interstices where the etched and bridging plates meet will come opposite the gap in the impression cylinder, and therefore cannot come in contact with the sheets being printed.

In the arrangement shown in Figs. 4, 5, and 6, in which a web of paper is used, to prevent any small quantity of ink that may lodge in a similar manner coming in contact with the paper, I slightly separate the impression cylinder from the plate cylinder at this position by cam pieces fixed on the ends of the former acting against small rollers fixed to the side frames. This device is, however, not shown in the drawings, and forms no part of the invention.

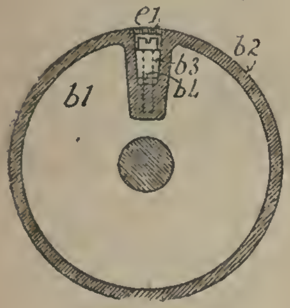


Fig. 4.

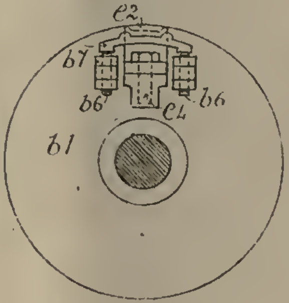


Fig. 5.

Although I mention that when the bridge plate is inserted the cylinder's surface will be continuous and of an equal radius, it is evident that the surface of the bridge plate need not be of the same radius as that of the etched plate, though this is preferable. As long as the bridge plate presents a surface that the inking roller and scraper blade can act efficiently on, and that does not injure the latter, it may be of any shape desired.

In Figs. 7, 8, and 9 an alternative method of fixing the ends of the plate to that in Figs. 4, 5, and 6 is shown, though the latter method is preferable. In this case the wedge-shaped piece for holding the ends of the plate and the bridge plate between these ends is in one piece. This piece g^1 carries at both ends projecting studs g^2, and on the ends of the cylinder are fixed, but capable of revolving, the arms g^3 which carry at their ends the eyepieces through which the bolts g^4 pass. When the ends of the plate b^2 are turned in, the wedge-shaped pieces g^1 inserted, and the arms g^3 turned over above the studs g^2, by inserting and screwing in the bolts g^4 into the projections b^8 from the cylinder's ends, the wedge-shaped pieces g^1 will not only draw in and securely hold the ends of the plate, but will present with the etched plate a continuous surface for the inking roller and scraper blade to act on.

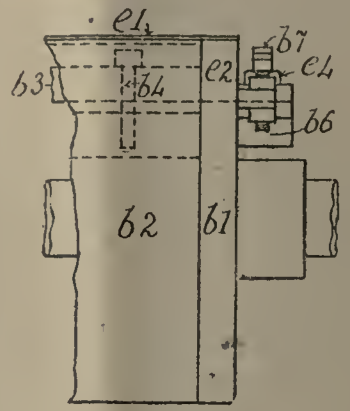


Fig. 6.

It will now be seen that when a thin etched plate is placed round the plate cylinder and securely fastened to it, and the bridging plate is inserted, the cylinder will present a continued surface for the inking roller and scraper blade to act on, and that the impression cylinder will bring the sheet against the etched plate, the bridging plate then coming opposite the gap in the cylinder's surface. As the ends of the cylinders meet each other at this gap no pressure can come on the bridging plate, which can consequently be of a light construction.

Fig. 7.

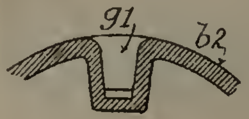
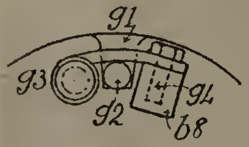
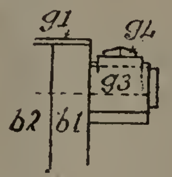


Fig. 8.





If two plate cylinders and two impression cylinders are used, as they would be when both sides of the paper were being printed in one machine, then the same bridging device would be applied to both plate cylinders.

If again several plate cylinders with one impression cylinder, or one large cylinder carrying several plates with one impression cylinder or more impression cylinders were used to print sheets or webs of paper in colours, on one or both sides, then the device would be applied to bridge over the interval between the ends of every plate, or between the ends of every two adjoining plates.

My attention has been called to the following specifications the inventions described in which it is considered may claim or describe in part my invention.

14,819 of 1899, Newton. The part of the specification of this invention to which attention is called relates to means for fastening zinc or aluminium plates to cylinders. I, however, make no claim having this object in view.

25,050 of 1907, Lock. This invention relates to printing in colours, three printing cylinders acting intermittently against one large impression cylinder. The specification states: "The plate cylinders carry printing plates which can be in the form of shells, plates, or blocks." No means are shown for fastening any of these to their cylinders, and no gap between the plate ends is mentioned, consequently no method for preventing ink getting into the gap is described.

13,153 of 1913, Smith. In this invention the difficulty of satisfactorily bridging the gap is recognised, and is met, as follows:—"*e* is the soft metal bar or filling introduced into the cavity *a* expanded so as to secure it in position, and manipulated so as to complete the circumference of the plate *b*."

4018 of 1915, Tallent. In this invention a thin open-sided bar with projecting tongues fitting into recesses in the ends of the plate is used to fill the gap, and it is stated that strips of felt may be inserted between the lips of the plate to preclude any ink getting into the joint.

10,550 of 1915, Rushen. This invention is in connection with a web intaglio printing machine, and as the web is in constant contact with the plate printing surface it relates to means by which it can be kept free from ink where the plate ends. The patent chiefly covers the means employed for obtaining a flat printing surface, the plate being rigidly held at one end and by suction at the other. It also covers rolling or forcing lead or annealed copper into the space where the ends of the plate meet.

100,616 of 1916, Rushen. This invention relates to means for automatically removing the doctor blade when it reaches the gap between the ends of the plate or plates to prevent its accumulating ink on its upper surface and afterwards transferring it to the plate from which it would reach the web.

In my invention the printer has a clear space in which he can fasten the ends of the plate, and fastening devices by which the plate can be stretched absolutely smooth over the surface of the cylinder, though I make no claim for this method of securing a plate. Then after the plate is fixed, the bridge piece is fitted in position and is rapidly and easily secured there, thus forming with the plate a continuous surface of equal radius. There are no strips of felt required to prevent the very liquid ink that is used from getting into the gap, and the latter does not require to be filled up with lead or other metal requiring to be afterwards brought to an absolutely true surface, and also requiring to be removed after printing has taken place, though this is not mentioned by the patentees, both operations having to be done in a very short space of time as several plates may be printed from by one machine in a day.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, August 19 to September 18:—

Emulsion Coating.—No. 13,488. Method of coating sensitised dry plates. L. F. and W. Barron.

Cleaning Old Negatives.—No. 13,489. Method of stripping films off old negatives. L. F. and W. Barron.

X Ray Cinematography.—No. 13,556. Apparatus for production of radiographic photographs cinematographically. V. A. Bruce.

Washing Prints.—No. 13,575. Apparatus for washing photographic prints. P. H. Waddell.

Apparatus.—No. 14,090. Photographic apparatus. S. W. Hull and A. V. Spratley.

Colour Cinematography.—No. 14,576. Colour moving pictures. G. W. Berwick and J. Shaw.

Colour Cinematography.—No. 13,461 2. Multi-colour screens for natural colour animatography. J. Camiller and J. C. Lyell.

Mounting.—No. 13,635. Mounting photographs. H. V. Church.

Cinematography.—No. 13,569. Manufacture of non-inflammable films for cinematographs. W. J. Stevenson.

Panoram Cameras. No. 14,255. Film panoramic camera. N. Stefani.

Photogrammetry.—No. 14,256. Photogrammetric apparatus. N. Stefani.

Colour Cinematography.—No. 13,201. Method of producing moving pictures in colours. J. Shaw.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Pyrogallic Acid Crystals (Design).—No. 383,955. Pyrogallic acid made in England. John Leonard Rose, trading as J. L. Rose, the Old Gas Works, Abbey Road, Barking, London, E.; chemical manufacturer. June 17, 1918.

REGISTRATIONS RENEWED.

Lion (Device). No. 266,970.—By the Imperial Dry Plate Co., Ltd., in 1904. (Class [illegible].)

Mequin. No. 267,414.—By John J. Griffin and Sons, Ltd., in 1904 (Class 1.)

TRADE MARKS REMOVED FROM REGISTER.

In the official language of the "Trade Marks Journal" the following trade marks have been "removed from the register through non-payment of renewal fees." Such non-payment is of course the method adopted by a firm having no further occasion for the use of a mark.

Cubrome. No. 264,452.—Registered by H. Edmund and Co. in Class 1 in 1904.

Fixona. No. 264,529.—Registered by Criterion, Ltd., in Class 39, in 1904.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, September 28.

Hackney Photographic Society. Outing to Wanstead Park.

Monday, September 30.

South London Photographic Society. "Portraiture." N. E. Lubashez.

Tuesday, October 1.

Manchester Amateur Photographic Society. Social evening.

Wednesday, October 2.

North Middlesex Photographic Society. Further Notes on Composition. E. C. Ridge.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held on Friday, September 13. Present:—Messrs. A. Basil, A. Corbett, A. Ellis, S. H. Fry, G. Hana, R. Haines, Lang Sims, R. N. Speaight, H. A. St. George, F. G. Wakefield, A. H. Ll. Chapman (Swansea), J. W. Beaufort, Frank Brown (Leicester), W. Illingworth (Northampton), P. Lankester (Tunbridge Wells), T. Reveley (Wantage), and A. Mackie.

A list of seventy new members was read.

The Hon. Secretary reported that he had written to the Director of Photographs for information as to collection of photographs now being made, but had received no acknowledgment of his letter.

Report received from the Secretary of the Society of Master Photographers (Lancashire and District) was read.

The Hon. Secretary reported that, in accordance with instructions, he had written a letter to the "British Journal of Photography" for publication, calling the attention of photographers to ~~the necessity~~ of making provision for the necessity of providing old negatives when ordering fresh supplies of plates.

The Hon. Secretary reported that a number of members of Council had had a conference with Mr. Gerald Bishop, of Marion's, and Mr. Bishop had explained the situation with regard to the shortage of glass and other matters. It was decided to invite the other plate manufacturers to receive a deputation, either collectively or individually, to discuss the present position, and the Hon. Secretary was instructed to write a letter to the "British Journal" for publication, stating the course the Council was taking. A committee was appointed to act as a deputation if the request was complied with.

In reference to the report of the Select Committee of the House of Commons on the Luxury Tax, it appearing that the basis of taxation of the French tax, which was on "portraits," had not been adopted in the report of the Select Committee, and that the basis substituted was "photographs." It was pointed out that many classes of photographs could not reasonably be regarded as luxuries, whatever their price. After discussing the means to be adopted to obtain a rectification of the basis, Mr. Lang Sims undertook to endeavour to get Mr. Davison Dalziel, M.P., a member of the Select Committee, to receive a deputation of the Council so that their views might be considered. A committee was appointed to act as a deputation.

A letter was read from Mr. J. Read, hon. secretary of the Society of Master Photographers (Lancashire and District), in reference to the Council receiving a deputation from that body. The Hon. Secretary was instructed to express the pleasure the Council would feel at meeting their provincial friends, and also to make the necessary arrangements for the meeting to take place on the evening of the next Council meeting.

The Hon. Treasurer made a report as to the finances of the Association.

CROYDON CAMERA CLUB.

A happy feature of this club, ostensibly photographic, is that by some mysterious means it manages to attract to its ranks experts in many branches of science. One of the latest recruits, Mr. H. Guy Johnson, among other learning, has an extensive practical and theoretical knowledge of the electric alternating current, which may be defined as a manifestation of energy gone sublimely mad owing to continual reverses. By comparison, the direct current is sanity itself, and refuses to play the tricks associated with its eccentric brother. Moreover, it is more understandable, and those who through long years have grown electrically in its sole company find the alternating business very hard to assimilate, the pure "blooming practical" the most of all. It may be added that Mr. Johnson is also a good technical photographer, and has lately taken to portraiture, well pleasing his sitters. His means permits the lavish use of half-plates, but he rarely allows the top of the head to extend more than midway along their length. Or, employing an electrical analogy, if the dry-plate is regarded as an auto-transformer he takes off at the neutral point, which results in war-time economy of paper, quarter-plate, or, at most, 5 × 4 size, sufficing for the prints.

A short time ago, when discussing electrical matters with the "office boy," he attempted to explain and the boy to understand how a "phantom telephone circuit" operated. By the time the well-meaning instructor had arrived at "phantom, phantom circuits," the youth began to feel a small fraction of a shadow himself, but pulled round with a brilliant inspiration. "The very subject for one of our informal meetings," he declared; "do it then, and not now," he implored, and ultimately the gravely doubting expert was prevailed upon. A dirty trick to play, yes, certainly, but the lad is a sorry varlet.

So last week Mr. Johnson arrived in all blue-eyed innocence to explain to a practically non-electrical audience one of the most spooky phenomena that ever apparited. Some juice. Even a Rochester professor would hardly attempt to explain to a mothers' meeting mathematical equations representing plate curves, yet the lecturer was up against a very similar proposition. Nevertheless, and wonderful to relate, he made good, and the distant port and city of Vancouver in his person justified itself at Croydon.

To put the matter as simply as possible. Assume two telephone circuits are in operation from one town to another, then by inserting in the apparatus at each end some coils of wire, and making certain connections, one or two additional trunk circuits spring into existence; phantomatic because they are non-existent physically, yet allow operations to be conducted precisely as if three or four circuits connected the towns in place of the original two. "This saves some copper," said the lecturer, a statement ill-adapted to start an argument upon. Although the mechanical parts are simple, the phantom principles involved are not easy to materialise, and with this brief reference the subject must be left. Any desirous of further information doubtless can secure it through the medium of the "B.J.'s" electrical staff in "Answers to Correspondents." Some of their replies have been studied by professional electricians with great interest.

A most cordial vote of thanks was accorded Mr. Johnson for a really instructive and interesting evening. The president, Mr. A. F. Catharine, in proposing it, complained that the secretary had sent him an intimation that "phantom currents" were to be discussed, and he accordingly had inferred one aspect of a war-time grocery business was to be considered. Instead, they had listened to a capital exposition on one manifestation of natural magic in electrical science.

News and Notes.

The Traill Taylor Memorial Lecture.—The twenty-first annual lecture, delivered as a memorial to the late J. Traill Taylor, will take place on Tuesday, October 15 next, at the house of the Royal Photographic Society, 35, Russell Square, London, W.C.1, at 7 p.m. The lecturer will be Mr. F. Twyman, of Messrs. Adam Hilger, and his subject "The Use of the Interferometer in Testing Optical Systems."

Photographic Classes at Battersea.—The prospectus of the evening classes in photography for the session 1918-19 at the Battersea Polytechnic is now obtainable on application, and will show the very comprehensive course of lectures and demonstrations for which Mr. Edgar Senior, an old and experienced teacher, is responsible. In addition to the general course, which is held on Monday evenings, commencing September 30, there is a course of twelve practical classes in enlarging.

Society of Master Photographers (Lancashire and District).—A general meeting of the above society will be held on Wednesday, October 2, 1918, at the Old Bull Hotel, Church Street, Blackpool. Chair will be taken by Mr. N. S. Kay (president) at 6 p.m. prompt. An interesting list of agenda will be placed before the meeting, and the latest phase of the situation affecting the recent advance in plates and materials will be discussed. All applications for membership (which have first to be submitted to the committee) should be in the hands of the Hon. Secretary, Mr. F. Read, 14, Balfour Road, Southport, before September 30.

Wounded Soldiers Entertained.—The members of the staff of Messrs. Thomas Illingworth and Co. entertained a party of wounded soldiers at the works on Saturday last, the 21st inst. Mr. Thomas Illingworth was unavoidably prevented from being present, and in his absence the guests were received by Mr. W. Taplin. Motor-cars conveyed the visitors to and from the works, and a very enjoyable time was spent. An excellent entertainment was provided under the direction of Mr. Harry Baker, a member of the staff, through whose instrumentality several well-known professionals appeared, and they, together with other members of the staff, rendered a splendid musical programme, interspersed with games, competitions, etc. Tea was provided, to which the boys did ample justice. Altogether it was a most pleasant afternoon for all concerned.

Instruction in Process Work.—Apropos of our recent reference to the courses of instruction in photo-mechanical processes at the Manchester College of Technology, we have been interested in receiving a number of specimens of work by students of the college, all covering a period embraced within that of the war. These specimens cover work in rotary photogravure, half-tone engraving in monochrome and colour, lithography, and photo-zinco, in addition to the mechanical work of letterpress composition and machining, which is included within the scope of the Printing and Photographic Technology Department of the Manchester College. The specimens represent technical work of an exceedingly high order, and are in themselves sufficient testimony to the efficiency and thoroughness of the instruction which students receive.

An Exhibition of "Key" Industries.—Mr. H. J. Mackinder, M.P., chairman of the Tariff Reform League, desires to draw attention to the fact that, by permission of the Ministry of Munitions, an exhibition of new British and "key" industries, organised by the Industrial Section of the League, will be held at the Central Hall, Westminster, London, next month. The exhibition will be open, by ticket only, on Monday, October 7, and to the general public, admission free, on and after Tuesday, October 8. It will remain open until October 22, after which it will be shown in Manchester and other leading provincial centres of population. The exhibition will include a very remarkable collection of photographs and diagrams. All interested are invited to communicate with Mr. Edward J. Duveen, chairman of the Industrial Section, Tariff Reform League, 7, Victoria Street, London, S.W.1.

TRIBUNAL APPEALS.—At the Wilts Tribunal a N.S. appeal was that against October 1 given to Stanley Percival Sutton, photographer, Salisbury, 28, single, Grade 3, on the ground that photographers were badly wanted in the R.A.F

Lord Bath: To take photographs above?

Mr. Morley: And a lot of them below.

Lord Bath: Surely you are not going to send a Grade 3 man to take photographs at a height of several thousand feet?

Mr Morley: They are wanted for developing

Lord Bath said the final condition would be imposed, the date being brought back to September 30. There was no doubt such men as applicant were wanted "out there."

EXEMPTION FOR PHOTOGRAPHIC WORKERS.—Photographic workers who come within the conditions ruling in the new list of certified occupations may now claim exemption from military service on the ground of being engaged on work of national importance. The list, which came into force on September 26, includes the following employees of a photographic press agency:—Operator, bromide printer, and head of despatch room if in Grade I and born before 1875, or in Grade II. and born before 1880, and all men in Grade III. Protection may also be claimed for all classes of skilled workmen engaged in the manufacture of plates, paper, or films for aerial cameras if in Grade I. and born before 1876, or in Grade II. if born before 1883 and for all men in Grade III But it must be borne in mind that a man must show that he was engaged in such occupation before January, 1918, and that it is his usual and principal occupation. He must also be in possession of a certificate of exemption, for which application should be made in accordance with the regulations to the local tribunal.

DEATH OF MR. A. S. ESSLEMONT.—We regret to record the death last week, after a somewhat lengthy illness, of Mr. A. S. Esslemont, C.B.E., who, if perhaps not known by name to the generality of those in the photographic world, has due to his memory a tribute for the services which he rendered in the early days of the war in connection with the provision of all descriptions of scientific and optical instruments for warfare. Mr Esslemont became associated with the Ministry of Munitions soon after its formation in the summer of 1915, and rendered valuable service in the Optical Department, the head of which at that time was Mr (now Professor) F. J. Cheshire. On Mr Cheshire's accepting the post of Professor in applied optics at the Imperial College of Science, Mr Esslemont became Controller of the Optical Munitions Department, which since that time has included within its scope glassware (and the production of optical glass) and potash production. Of delicate health, Mr Esslemont may be said to have been among those civilians, like Major C. D. M. Campbell and Lord Rhondda, who, though not engaged in the deadlier business of fighting, nevertheless sacrificed their lives in the prosecution of the war

END OF SUMMER TIME. The Home Secretary gives notice that Summer Time will cease and normal time will be restored at 3 a.m. (Summer Time) on the morning of Monday next, September 30, when the clock will be put back to 2 a.m. The hour 2-3 a.m. Summer Time will thus be followed by the hour 2-3 a.m. Greenwich time.

All railway clocks and clocks in post offices and Government establishments will be put back one hour, and the Government requests the public to put back the time of all clocks and watches by one hour during the night of Sunday-Monday, September 29-30. Employers are particularly recommended to warn all their workers in advance of the change of time.

The public are cautioned that the hands of ordinary striking clocks should not be moved backwards. The change of time should be made by putting forward the hands 11 hours, and allowing the clock to strike fully at each hour, half hour, and quarter-hour, as the case may be. The hands should not be moved while the clock is striking. An alternative method in the case of pendulum clocks is to stop the pendulum for an hour.

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

MECHANICAL RETOUCHING PENCIL.

To the Editors.

Gentlemen,—May I thank you for the illustrated notice of my patent in your current issue. The following particulars may interest your readers. The pencil-point merely revolves on a tiny circle, but as the pencil is moved over the surface of the negative, the stock "stroke" of the retoucher is produced—a kind of continuous 3. The "stroke" may be maintained at any speed without any effort on the part of the operator other than that of gently moving the lever of the "motor." The spring of the pencil ensures even contact of the pencil-point on the negative. There are other points—such as the adjustability of the size of the "stroke"—which I need not enumerate here, but I hope my little invention will reduce the tediousness and burden of photographic retouching, greatly increase the speed of the work, and improve the quality (because the "stroke" is so much more under the control of the operator). As the "stroke" is automatically produced, apprentices may become skilled retouchers in a much shorter time.—Yours faithfully,

ARTHUR J. BLACKBURN.

Aruba House, Burnopfield, Co. Durham, Sept. 22

INCREASED PORTRAIT PRICES

To the Editors.

Gentlemen,—With the present prices of materials and labour, which are out of all proportion to former times, it would be perhaps interesting to know what steps, if any, have been taken either by the profession as a whole or by individual workers to place some of this extra burden on the clients. Where in some places the photographer has been so much more busy, he will not, perhaps, notice the extra costs, but when the business remains more or less the same it becomes serious

Moreover, in the common interest (although I fear there is very little of this amongst professionals as yet), surely the clients ought to pay more for portraits as much as for any other product.

Personally, I have for some time charged more, as in July, 1917, I put a surcharge of 10 per cent. on all prices, and in June, 1918, I, after consultation with another professional in a near-by town, increased this to 20 per cent. I first also consulted the other photographer in my own town, and we both agreed to do the same.

Printed slips were, and still are, put in every letter and order sent out, and a notice displayed in the reception room also. I have not had a single complaint, and, moreover, people seem to think it is quite an expected thing in the present state of business in general.

I think that putting a flat rate of so much per cent. is better than altering individual prices for different styles, as it causes less confusion, and later on possibly can be taken off again.

We do not go into pence details, but count it as 4s. on every 20s., and 2s. on 10s., and 1s. on less than 5s.

For instance, an order for portraits which amounts to one guinea would be charged as follows:—

One doz. so and so portraits	£1 1 0
Plus 20 per cent. war charge	0 4 0
Total	£1 5 0

Perhaps some of your readers will be good enough to say in your columns what they have done, as it would be interesting to know.—Faithfully yours,

G. F.

Commercial & Legal Intelligence.

LEGAL NOTICES.—Notice is given that at the expiration of three months from September 20, the name of the Granville Studio, Ltd., will, unless cause is shown to the contrary, be struck off the Register of Joint Stock Companies, and the company will be dissolved

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

COL. C.—We do not know the book you mention. The only thing we can suggest is that you write to the Librairie Gauthier-Villars, Quai des Grands Augustins, 55, Paris. This firm published other works by M. Geymet.

W. A.—Ordinary artists' oil colours, applied with a dabber, giving two coats if necessary, answer well for title slides. To colour them use the ordinary varnish colours sold for painting lantern-slides, but put them on the cover-glass and bind up.

A. E.—We gather from your letter that you are not starting a regular photographic studio or business, but are working to order, in which case a licence is not required. The order in question is fully dealt with in our article on page 422 of the "B.J." for September 20.

E. B.—As far as exposure and development go, the postcards are quite satisfactory. There is, however, a generally dirty appearance all over the surface, and in one there are decided stress marks. The vignetting is very poor, and the heads are rather low on the cards.

D. M.—The background may be placed at either end, as may be convenient. Dark blinds to windows to rise to 5 ft. from floor if needed, thin white blinds or curtains above to be used when the sun is on the windows. From 8½ to 10 inches will be the most useful focal lengths for your purpose, with an aperture of not less than ƒ/4.5.

F. M.—The effect is got by using a dark background and a vignetter, which is simply a dark card with a curved serrated edge, placed about 2 feet in front of lens. The whole thing can be obtained complete for a few shillings from the Tress Company or Kodak. The hair does not appear to be retouched; the lighting is got by using almost a toplight.

M. M.—1. You might try Messrs. Marion and Co., Soho Square, London, W.1, or Messrs. Fallowfield, 146, Charing Cross Road, London, W.C.2. But we are afraid you will not be able to procure any. 2. We know of no bromide paper thin enough. Have you tried the Kodak Transferotype? 3. There is no method of restoring the stale paper.

J. H. T.—The tone given to bromide prints by a solution of liver of sulphur varies greatly with different samples of paper; some tone to a sepia, while others will not go beyond a purple, similar to P.O.P. The tone can be controlled by the time of immersion in the solution, but it must be remembered that the colour gets much warmer during the washing after toning.

C. R.—1 and 2. It all depends on the quality of the individual lens. One might be as good as the other, but one could only judge by the actual results. 3. Probably only under test conditions would any noticeable difference be seen. 4. The enlargement would naturally follow the negative in quality. One would always examine a negative for definition with a magnifier.

B. J.—We are sorry we are unable to give you much serviceable information in the absence of any particulars of your friend's generating plant, as it is not wise to try to work on too narrow a margin. For 3,000 c.p. in half-watt lamps you will require 15 amps, and about the same for an enclosed arc. The mercury-vapour lamp uses the least current, only taking about 5 or 6 amps. Ordinary metal filament lamps would be almost useless, as the light is too yellow. If you can send further particulars we shall be pleased to give fuller assistance.

SPOILT P.O.P.—I have a lot of P.O.P. postcards, which show a yellow stain when toned and fixed. Will you be so kind as to let me know if there is anything I can add to the toning or fixing bath which will remove the stain. I think the stain is caused by the cards being too long in stock. I enclose a card toned and fixed showing the stain, also a card unprinted, where you will see the stain also.—J. G.

We are afraid the cards are hopeless. They have evidently been exposed to some sulphurous vapours.

M. J.—The four 2,000 c.p. lamps will give ample illumination for anything you require. We should place them in a curve, the first in the middle of the studio 8 ft. out from the background; then the others about a foot apart, so that the nearest to the wall which will give side light will be about 5½ ft. from the background. The lamps should be made to raise and lower from 8 ft. to 5 ft., and have a separate switch to each. Ordinary calico should be used for a diffuser. It is a good plan to have lamps on the solid side of the roof; they do not then interfere with the blinds.

H. G.—Cinematograph negatives are usually made by a combination of mercury-vapour tubes and arc lamps, although we believe that half-watts are now coming into use. No condensers are used. The examples you send are terribly under-exposed. You would do better with the half-watt lamps, but a single 1,000 c.p. will call for rather long exposures. One of 1,500 or 2,000 c.p. would be better; with such a lamp you could easily get the broad effects you desire. A certain amount of reflected light is necessary to give some detail in the shadows, which should never be quite empty. You can, if you prefer it, use an enclosed arc with equally good chance of success.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully and correctly prepaid, senders of line announcements are asked to bear in mind this revised tariff. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less	1/-
Extra words	1d. per word.

(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

"Box No." and office address ... ... charged as 6 words.

For forwarding replies add ... 6d. per insertion for each adv't.

If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

Advertisements are not accepted over the telephone.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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SUMMARY.

As the liberation of as much glass as possible so that it may be re-coated is now of prime importance, the description of a method by which the gelatine film may be safely stripped from its support and stored in a portfolio, will be welcome to many of our readers. It is a modification of a process devised by Mr. R. B. Fishenden, and will be found on page 446.

It is not always easy to ascertain the exact time of day at which a building or other outdoor subject will be suitably lighted, but by following out the system given on page 447 difficulties in this direction should disappear.

The Professional Photographers' Association has had a record number of applications for membership before the last Council meeting. We trust that this record may be equalled or broken at subsequent meetings. (P. 445.)

An exhibition of work by Mr. Essenhigh Corke is now on view at Hampshire House, Hammersmith. Particulars will be found on page 451.

The value of photo-mechanical plates for other than process work is the subject of an "Assistants' Note" on page 450.

An eyesight saving method, involving little trouble or expense for illuminating negatives while retouching, will be found on page 445.

Artificial lighting for studios occupies the greater part of "Answers to Correspondents." (P. 452.)

A list of evening lectures to be given during the forthcoming exhibition of the Royal Photographic Society will be found on page 450.

A challenge to the plate-makers, and an interesting communication on the legality of sending short messages on postcards at the halfpenny rate are the principal features in "Correspondence" on page 451.

"Colour Photography" Supplement.

War type is not connected with the world conflict now raging, but is a simplified bromoil [illegible] type process, invented by Miss Agnes B. Warburg. (P. 37.)

The concluding section of the article on the resolution of mixed colours by differential visual diffusivity, by Mr. Herbert E. Ives, appears on page 38.

Those Autochrome workers who have been troubled with frilling will welcome an alleged infallible method of preventing it which is detailed on page 39.

Miscellaneous methods of screen-plate making, and two- and four-colour processes with some remarks by Von Hübl, form the subject of "[illegible]" on page 39.

EX CATHEDRA.

Light for Retouching. During the summer there is little need for retouching by artificial light, but now we have come to the end of the daylight saving period a good many hours of close work by lamplight will be needed every week, and every retoucher who realises the value of the only pair of eyes she will ever have should take the precaution of providing a comfortable working light before the season becomes further advanced. Where electric light is available the task is an easy one, for it is then possible to place the bulb directly under the negative, using a ground glass or a piece of flashed opal as a diffuser, and a pale blue or green-dyed film to make the light cooler for the eyes. If a gaslight or oil lamp has to be used, then some sort of condenser is needed, so that the light can be placed at some distance from the desk and yet give a sufficiently good light. Specially made globes or bottles are used for this purpose by jewellers, engravers, and sometimes shoemakers, and these may be purchased from the dealers in jewellers' materials in Wardour Street and Clerkenwell. They resemble a glass globe on a bell-shaped foot, the upper part being filled with water tinted blue. This is best done by using nitrate of copper, but a few drops of aniline dye will answer nearly as well. An ordinary clear round water bottle will make a cheap substitute if a stand can be improvised. It must be so placed that a beam of light is projected upon the ordinary opal or card reflector, or if preferred directly upon a ground glass diffuser under the negative. The great point is to have a strong enough light. We have known retouchers who have had to go through all their negatives the morning after they were done to see if any more work was necessary. This need not be the case if a proper light be used.

* * *

Joining Up. Our professional readers will be glad to note that at the last Council meeting of the Professional Photographers' Association seventy new applications for membership were considered. This is a distinctly healthy sign, for it shows that at last photographers in this country are waking up to the fact that the only chance of securing fair treatment from the world at large lies in a strong combination which represents the true feeling of the profession and is managed by its most respected members. The war has naturally interfered with the normal activities and gatherings of the association, but it has caused no stagnation on the part of the Council, as the recent reports of work done in connection with plate prices clearly indicate. In this matter the action of the Council has been admirable, and should go far to allay the fears of those who thought that the Association calmly acquiesced in the plate makers' demands without a murmur. Without taking sides in the matter, every reasonable being must agree that if there is a strong and complete union of plate makers there should be an equally strong union of plate users to be able to make a satisfactory bargain. We look forward to the time when the annual congress will be the great photographic event of the year, not only to the members but to the general public, who should have the opportunity of seeing an annual display of professional work in all its branches. The existing exhibitions necessarily exclude much excellent work because it has no specially artistic qualities, but manufacturers and publishers, to say nothing of possible sitters, would be very glad to have an opportunity of seeing what up-to-date photographers can do. Therefore should we be glad to record seventy new applications for membership at every Council meeting till every reputable photographer has joined the Association.

STRIPPING NEGATIVES FOR STORAGE AS GELATINE FILMS.

The conditions for the supply of dry-plates have naturally turned the thoughts of photographers towards methods which may be employed for returning the stipulated quota of glass whilst retaining in their possession such negatives as they judge will be of value from the point of view of re-orders. In ordinary times one would not recommend as a working system the stripping of the negative film from its glass support and its preservation in the form of a thin sheet of gelatine without other support. But it can readily be understood that many studios may be so circumstanced as to find it desirable, if not necessary, to adopt such a plan as this; and therefore it may be of interest to say something on the practical means which may be adopted to this end.

The stripping of a gelatine film from its glass support is by no means a difficult business, and the process which for some years past we have regularly recommended in the "Almanac," namely, that of Holcroft and Middleton, is one which is thoroughly reliable. But it is slow, it is not adapted for the stripping of films which are to be preserved as such, and, further, it demands the use of methylated spirit. On these three different accounts it is not a method which can be usefully applied for the purpose now under consideration. Instead, it is necessary to employ a process in which the gelatine film is thoroughly tanned before removal from the glass; that is to say, so hardened that it can be handled and stored as a thing by itself without fear of being damaged under such reasonably careful treatment as so delicate an article requires. For this purpose the most suitable method is a modification of one of which very complete working details were given some time ago by Mr. R. B. Fishenden, of the Manchester College of Technology, by whom it was worked out. In this process the gelatine film is first hardened in a bath of formaline and then detached from the glass by means of a similar bath of formaline, but containing also hydrofluoric acid. The advantage of the process from the point of view of those who may require to treat considerable numbers of negatives by it is that negatives may be treated in batches in the plain formaline bath, whilst the action of the second bath, containing hydrofluoric acid, is rapid. It should be said that we would not claim for the process a degree of reliability which may be ascribed to the Holcraft-Middleton method, meaning by "reliability" the power of the process to strip with certainty even negatives which are of considerable age, and may have become horny and hard with time. But we do not think that any inferiority in this respect need trouble photographers in the present circumstances, since from the nature of things the negatives to be treated will be those of comparatively recent date, and will not have become hard and horny with time.

The first step in the process is to cut through the gelatine film to the glass with a sharp rigid knife close to the four edges of the plate in order to cut away any emulsion coating which may be adhering to the edges of the glass. The plates are then immersed in formaline, the commercial liquid as purchased, for ten minutes or so. The formaline bath may be placed in a grooved tank, and is best used in a tank, not only on account of handling a number of plates at once, but also because the vapour of the formaline can be more or less prevented from escaping by means of a lid on the tank. After this first treatment, during which the gelatine film becomes thoroughly hardened, the plates are transferred, or only so many of them as can be expeditiously handled, to a similar bath of formaline to which commercial hydrofluoric acid has been added in the proportion of 2 per cent.; that is to say, ½ oz. of the acid to 25 ozs. of the bath. This second bath should be used in a vulcanite dish. It is necessary for the negative to remain in this second bath only for the matter of 20 seconds or so, after which the negative is removed from the solution, given a rinse under the tap, and the narrow edgings of gelatine then stripped off. It is then given a further short wash in order to remove traces of acid. This washing is best done in a flat dish into which a gentle stream of water is led; washing in a tank, particularly with any vigorous flow of water, is liable to disengage the film from the glass prematurely.

The negative is now in a condition to have its film removed from the glass, which is done by laying upon it a slightly larger sheet of tough paper, such as good writing paper, previously soaked in water. The paper is brought in firm contact with the negative by careful use of a squeegee. Undue action of the squeegee must be avoided, otherwise the negative is liable to be distorted. A corner of the paper is then raised, and a thin pointed knife used to ensure the corresponding corner of the negative adhering to it. This being so, the paper can be removed, carrying the gelatine film with it.

In order that the film may dry without shrinking or distortion it is necessary to have it upon a glass plate, and a supply of such plates sufficient for dealing with a batch of negatives dealt with at a time requires to be kept. These plates are thoroughly cleaned and polished with French chalk, as is done when using them for the glazing of prints. The gelatine film, still thoroughly wet and adhering to the paper, is then brought down upon a clean glass plate, and, again by means of a thin pointed blade, the paper is removed, leaving the film upon the glass. The film then requires to be left to dry slowly. Any hurried drying is certain to lead to crinkling of the film, and for the same reason it is necessary to avoid drying in a place where there are irregular currents of air. The best plan is to lay the glass plates exposed to the air of a moderately warm room, the windows and doors of which are closed. Those who may have had occasion to dry the now perhaps forgotten Cristoid films will recognise the need of this precaution, although the ordinary film of a negative is thin in comparison with that of a Cristoid film, and dries in a correspondingly lesser time and with less liability to distortion. When the film is perfectly dry it is peeled off the glass, and can be kept in its then flat state by storing it where it will be subjected to a certain amount of pressure. One or two other hints may perhaps forestall any difficulties which may be found in this process. One is that negatives which may have been handled with greasy fingers should be first cleaned up by rubbing over the surface with benzene applied with a tuft of cotton wool. Negatives which have not been too heavily treated with retouching medium will strip readily, and some experience with existing negatives will show what amount of retouching they may carry without leading to difficulties in stripping or necessitating the removal of the retouching before the process. In the event of negatives being required for further prints, the film negative can, of course, be supported in the printing frame like one on celluloid film, whilst if it has been necessary to remove the retouching medium (calling for further retouching the negative will require to be soaked in a 1 per cent or 2 per cent. solution of glycerine before being squeegeed down upon a glass plate which has been flowed over with a weak solution of gum, this coating serving to hold the film to the glass, and thus making it practicable to carry out any retouching work which could not readily be done upon the negative in its film condition.

OUTDOOR LIGHTING.

The lighting of outdoor subjects has not received the study it deserves, probably because, unlike studio work, there seems to be no possibility of control. The direction of the light is one factor, and a choice between diffused light or direct sunshine is another that can be considered, and while obviously neither can be actually controlled, it is equally obvious that it is possible to decide what would be a favourable lighting for a subject and to photograph it at the particular moment when the desired conditions exist. The difficulty has been to determine if and when those conditions will occur. The elementary textbooks go so far as to tell us that the best lighting outdoors is when the sun is shining at an angle of 45° on to the subject. They do not tell us how to ascertain if and when such a lighting will be obtainable, or if we should sit on the grass and wait till King Sol condescends to glance in the desired direction. For it must not be thought that he is consistent in this matter throughout the year. On the contrary, quite apart from weather changes, the actual direction he shines in in different months at the same hour shows considerable variation, while in some aspects he seldom looks at all, and in others never.

Varying degrees of diffusion naturally are obtainable when the sun is more or less obscured by cloud, or else by exposing before sunrise or after sunset. In most cases the latter is not a very satisfactory expedient, because the flatness of the lighting is usually accentuated by more or less haze in the atmosphere at both ends of the day.

Here I may point out that even diffused daylight has "direction," which is the same as that of the sun at the same times of day. High lights and shadows will be in the same places, but not so clearly defined.

Having long ago realised that some accurate means of finding the time for any given direction of the sun's rays was not only very desirable, but really essential if best possible work was to be produced and disappointments avoided, I designed, with assistance from several sources, an instrument of extreme accuracy. This was exhibited at the R.P.S. a few years ago, under the title of "Sunshine Index," but it appeared to be a little too "scientific" to most people, although really it is just as simple to use as any exposure meter. The only previous attempt to fill this need in this country was a little watch dial, sold at a shilling, I believe, but this was hopelessly misleading in use. A French instrument which I saw once was better designed, but did not show variations for different times of year, and these are considerable.

I have now been successful in simplifying my original idea into the form of a table, which can be used in connection with either the dial illustrated or by means of one's watch dial. The way to use a watch is as follows:—Imagine each figure to have a cypher (0) after it, and *forget that they are hours.* If one first thinks of 10'—clock, 20'—clock, the imaginary change in the figures is more easily made and retained in memory. The dial will then read 10, 20, 30, 40, and so on, and each minute mark will represent two, as there are only five between each figure. (For an example, two marks past figure three would read 34.) My dial, Fig. 1, is now seen to be merely an illustration of this simple idea carried out in fact, instead of only in imagination. Number 60 (6 o'clock) is always pointed towards the north, and 120 towards the south.

Before using the dial or the table obviously it is necessary to examine the subject and decide what would be the most favourable lighting if we can get it, and perhaps an alternative or two in case the first choice is found to be impossible. We may want to take views from several positions, so that we have to decide also whether the same lighting will suit each point of view. Otherwise it will be necessary to fix the best light-direction in each case.

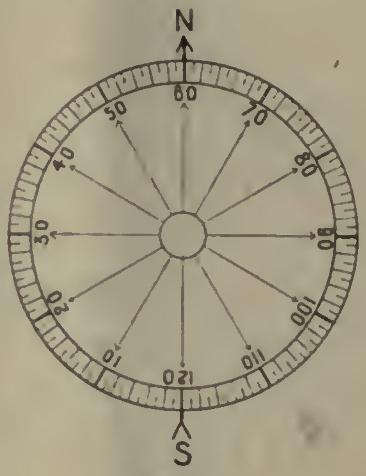

Fig. 1.

What I call "light-direction" is simply the line from the sun to the subject. When we look at our view, or building, or what-not, we say we want the light to be shining in such-and-such a direction, and we may point an arm to describe our meaning. Obviously this has nothing to do with the direction in which the lens is pointing, but is the line that *the shadow* of the operator will make at the time of exposure. As the sun moves round, so does the shadow, just like a hand on a watch, only more slowly and not so evenly. It is this fact that enables us to use a dial, with a real or imaginary hand, to register the light-direction definitely as a number.

When we have decided on the best lighting, or "light-direction," for the particular view under consideration, it is necessary also to discover where the cardinal points N. and S. are, if we don't already know them. There are three ways of finding this out. One is to ask somebody else, but information got in this way is usually inaccurate. A second method is to consult a map of the district and fix the position of the subject on it. The third method is to use a compass. The last-named calls for a slight correction in use as the true North and the

Magnetic North do not coincide. I am sorry to have to introduce this little complication, but there is the fact, and I am writing this for the man who knows what he wants and does not mind a little trouble to get it. For general work the correction is not of great importance and can be ignored, but in special cases exactness may be wanted, so that I will describe how to make the correction in its proper place.

Having decided on the "light-direction" required, and found the direction of North and South, the watch-dial is laid down or held in the hand, flat of course, with "60" to the North and "120" to the South, as previously stated. The large minute hand is now turned till it points in the predetermined "light-direction;" that is to say, in the direction the shadow of the operator *would fall* in when the desired conditions existed. The number that the hand points to according to the system of counting described above is the "light-direction number." After a little practice the actual turning of the hand can be dispensed with, or any straight-edge can be laid across the watch for the purpose. It is the simplest possible movement, though it may appear to require a lot of explanation. As soon as this number is obtained, all that is necessary is to refer to the table along the line for the existing month. The figure in italics approximating to our "light-direction number" is noted, and the figure at the top of that particular column is the hour to take the photograph.

To summarise the method: View the subject, determine the best lighting, hold watch as described, North and South, and point hand in required "light-direction," and note number on dial it indicates. Find nearest number in italics opposite the month in the table, and the hour above that number is the time at which the required lighting will exist. If there is no number in the italics near to the "direction number" we require, it indicates that the sun will not shine in that direction. It may do so in some other month, which is easily seen, but if the number is not on the table it never will at all, and either we must be satisfied with some other direction of the sun or with diffused light.

Now for corrections. When using a compass to find North and South, *either* subtract 5 from the "light-direction number" before consulting the table, *or* point 55 to the compass North, instead of 60. The table is computed for the middle of each month, and allowances can easily be made for intermediate dates and for between hours. The only other correction required is to add one hour when and where "Summer-time" is in force. To allow of the greatest possible use of the table I have left it according to the "old" time. It is suitable for all countries between latitudes North 40° and 60°, but the sunrise and sunset times will not be accurate far from England.

Obviously this system is not very convenient for getting extreme accuracy at intermediate times and directions, so I give a reproduction of the original "Index," Fig. 2. In this the small part A is cut out, including the notches at the months, and is fixed over the dial B with a pin through the centres. Any direction of light required is indicated by turning the black arrow to point that way and noting which spot engages with the month notch. All the spots on any dotted line represent the hour marked in the outer and inner circles against it. In this model the Magnetic North is marked so that it should be used when employing a compass in place of the block-letter cardinal points.

I propose describing examples taken from my actual experience, which I think will prove to the most sceptical that it is no mere freak idea or fad, but a positive benefit.

The first example is the first case which proved that my trouble in designing the "Index" was not wasted. I was ordered by my then employer to photograph a house the first fine morning, and to start out first thing in the morning to do it, as it was a three-mile walk to the place. It was one of those jobs where another man had turned out a very poor result, and it was up to me to make something better. It was a case for an extreme wide-angle, and on account of trees the house could only be photographed from one particular position. That night I went to the local free library and looked up the directory and the survey map. I found the house was one of a crescent, and as near as I can recollect the position on the map was like Fig. 3, in which the camera is shown pointing towards the front of the house. By laying the "Index" on the map, with N and S corresponding, I found, it being then midsummer, that the arrow showing the sun's direction was towards the back of the house, and consequently right on to the lens all the morning, so that had I followed my instructions I should have had to choose between waiting several hours for the sun to move round to the front or turning out an inferior result. Either of these alternatives would have brought the wrath of the gods upon me, and as it was the boss was none too pleased when he found on the next sunny morning that I was working indoors, and when I told him my reason for waiting till afternoon he failed to see how I could tell beforehand what the light would be like on a house I'd never been near. However, the result of my choosing the time by the instrument was satisfactory to all concerned, and the order was increased by at least 200 per cent. Another similar case was photographing the Automobile Club, the architect of which wanted a dead front view. This building faces almost due north, and permission to photograph from the balcony of the club opposite was obtainable for certain times in the morning only. As it was February there would be too much haze in the street for very early work, and it became a matter of exposing when the sun began to clear the air, but before it got round far enough to shine in the lens. As matters turned out, it became a real race, in which I won by less than two seconds. In this case I had not been able to get at a map, and used a pocket compass with the "Index" on the spot.

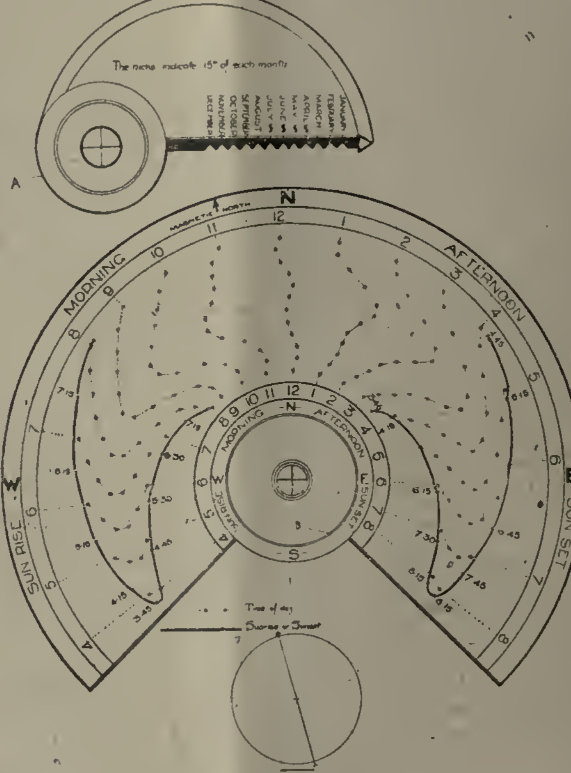

Fig. 2.

Sunshine Index.—Indicating the direction of the sun's rays at each hour from sunrise to sunset on the 15th of each month between latitudes North 40° and 60°.

OUTDOOR LIGHTING TABLE FOR USE WITH WATCH DIAL.

	Sunrise.		Morning.							Noon.			Afternoon.							Sunset.		
	Time.	Dial No.	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	Time.	Dial No.	
January	8	*41*					*41*	*45*	*50*	*54*	*59*	*64*	*69*	*73*	*77*					4.45	*78*	January
February	7.15	*37*					*40*	*44*	*49*	*53*	*59*	*64*	*69*	*74*	*78*	*82*				5.15	*83*	February
March	6.15	*31*				*31*	*38*	*42*	*47*	*53*	*59*	*65*	*71*	*76*	*80*	*85*	*89*			6	*89*	March
April	5.15	*25*			*28*	*32*	*36*	*41*	*46*	*51*	*60*	*67*	*74*	*79*	*84*	*88*	*94*			6.45	*95*	April
May	4.15	*19*		*23*	*26*	*30*	*34*	*39*	*44*	[illegible]	*60*	*69*	*76*	*82*	*86*	*91*	*94*	*98*		7.45	*100*	May
June	3.45	*15*	*17*	*21*	*25*	*29*	*33*	*37*	*41*	*51*	*60*	*69*	*77*	*83*	*87*	*92*	*95*	*98*	[illegible]	8.15	*103*	June
July	4	*17*	*17*	*21*	[illegible]	*29*	*33*	*37*	*43*	*50*	*60*	*68*	*75*	*80*	*86*	*91*	*94*	*98*	*101*	8 15	*102*	July
August	4.45	*21*		[illegible]	*27*	*31*	*34*	*40*	*44*	*51*	*60*	*67*	*74*	*80*	*85*	*89*	*93*	*96*		7.20	*98*	August
September	5.30	*27*			*30*	*34*	*36*	*42*	*48*	*54*	*60*	*67*	*73*	*78*	*83*	*87*	*91*			6.15	*92*	September
October	6.30	*34*				*37*	*40*	*45*	*50*	*55*	*61*	*67*	*72*	*77*	*81*	*85*				5	*85*	October
November	7.15	*40*					*41*	*47*	*51*	*56*	*61*	*66*	*71*	*75*	*80*					4.15	*81*	November
December	8	*42*					*44*	*47*	*51*	*56*	*60*	*64*	*70*	*74*						3 45	*77*	December

In countries where "summer-time" is in force, the clock time will be an hour later than shown in the table during the "summer" months.

Figures in block type are times of day. Italics are direction numbers. Find required direction on dial (Fig. 1) or on watch as explained in the text. Refer to indicated direction number against the month in the table (or approximate no.) and at the head of the column will be found the hour for that lighting.

When using a compass always *subtract* 5 from the direction number before consulting this table.

In photographing shop windows, to give a subject occurring frequently in commercial practice, the very best possible lighting is when the sun has just left one side of the road and is crossing over, as it were. In the case of a straight road the time can be found, approximately, on the map, but where a shop is in a bend it is advisable to use a compass on the spot. Car lines and iron posts may upset the accuracy of the compass, but it is a matter of a very few seconds to take two or three readings in such cases and strike an average. It is very little use trying to get reliable information as to the times that the sun shines or doesn't shine which is often equally important to us, on various aspects of shops or houses, from the inhabitants. They are more often wrong than right.

At one time I was employed on indoor work with instructions to photograph outdoor subjects around the neighbourhood when circumstances were favourable, results of special quality

Fig. 3.

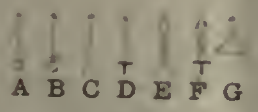

Fig. 4.

A. Direction of sunlight. B. Direction of diffused light. C. Direction of camera. D. Direction of camera with telephoto lens. E. With ladder stand. F. With telephoto lens and ladder stand. G. With wide-angle lens.

and attractiveness to cultured people being required. In this work the "Index" proved itself invaluable. I got a map of the ground to be covered and mounted it on stiff card, which was folded once, so as to go in the pocket. On the outside I made a numbered list of the various subjects. Over the face of the map I fixed a sheet of tracing paper by one edge. This arrangement I took on my walks around, and I would mark an arrow on the tracing paper showing the direction of the camera and of the light for the best views of each subject, at the same time jotting down, by means of abbreviations and conventional signs any notes of special apparatus that might help. These arrows were numbered to agree with the list on the back of the map. Then I could pick out in the evenings the times of day for the various lightings and go out accordingly. I show in Fig. 4 some of the conventional signs I used. They form a quick method of making notes, and prevent the need of carrying a full equipment to every job. As each view was taken it was marked off with blue pencil.

Naturally sunshine was not the only thing to be considered in this work, but it is the one factor which it is possible to take advantage of most easily. For flat, uninteresting buildings a direct lighting almost in line with its face was employed to get the largest possible areas of well-defined black shadow from the portions in relief. In other cases shadows were used to break up bad foregrounds, and against-the-light effects obtained, not just when they happened to be noticed, but calculated for beforehand. In a few cases it was possible to photograph certain interior features by means of direct sunlight through the window, where previously it had proved impossible to obtain results otherwise. In these cases much time was saved by determining beforehand the exact time to photograph when a sunny day should come along.

D. CHARLES.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

The Value of Process Plates.

Many photographers are not, to our mind, sufficiently familiar with what may be termed the special brands of plates designed to give superior results in certain classes of work. Among these may be mentioned the slow or process plate; which quite apart from the special kind of work for which it is intended, has great advantages to offer in certain other branches. These plates will give great density, perfectly clean shadows, and have a great latitude in exposure. For line drawings the process plate is practically the only one that will give satisfaction despite the idea of so many workers that an ordinary rapid plate may be made to serve if the negative is subsequently intensified, but one trial will be sufficient to convince even the most prejudiced worker on this point. When we have to make a plucky negative from one that is feeble and lacking in contrast, the slow or process plate will give us a much better result even without the subsequent intensification of the new negative than if one of the more rapid plates were employed and this is superior to attempting any intensification of the original, especially if we are not sure that this has been perfectly fixed and thoroughly washed. For the purpose of reproducing a weak negative by contact or by means of the camera transparency, a very vigorous result may be obtained by using a process plate, both for the transparency as well as for the second negative. This, however, by no means exhausts the uses of the process plate: on one occasion we were commissioned to photograph a block of new offices in a crowded street, and a wish was expressed that no indications of traffic or human figures should be in evidence in the prints; the place was visited at various times of the day but always without finding the particular quarter deserted

The difficulty was solved very simply in the following manner. A process plate was employed, having a speed of about 25H. and D. The lens was stopped down to F45, and a three times filter put on the lens. As the plates were not sensitive to yellow this was reckoned at about twenty times, a former test being used as the basis for this. With a diffused light an exposure of several minutes was given and the resulting negative showed no sign whatever of the passing traffic in the street, and was in every way satisfactory. It has been said that photographers as a whole pay too little attention to the study of technique; but it is certain if this were not so the value of the process plate would be far more widely recognised than it is to-day. Process plates may also be obtained in ortho and panchromatic grades, useful where a correct colour translation of the original is required.—Expert.

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Hon. Secretary, 5a, Pall Mall East, S.W.

October 14 to November 30.—Royal Photographic Society. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, October 7.

South London Photographic Society. "Mounting the Print." G. C. Weston.

Tuesday, October 8.

Manchester Amateur Photographic Society. Lantern Lecture, "The High Alps." P. S. Minor.

Thursday, October 10.

Hammersmith Hampshire House Photographic Society. "The Domestic Fly—Its Life History, Minute Structure, and its Menace to Health." George Rodman, M.D., F.R.P.S.

Commercial & Legal Intelligence.

Buying a Camera on Approval.—In the Shoreditch County Court, on Tuesday, before his Honour Judge Cluer, there was a sequel to an action reported in our columns of May 24 last, in which Clement Stone, trading as C. Stone and Co., of 17-19, Bridge Street, Cardiff, photographer, sued Mary Blanche Olley, trading as M. B. Olley, of 110, Southgate Road, N., and at Royal Studios, Pier Hill, Southend-on-Sea, photographer, to recover £15, the price paid for a camera which, it was alleged, failed to come up to what it had been represented to be. Judge Cluer's decision was that the money would have to be returned, and gave a verdict for the plaintiff with costs. Now the plaintiff came before the Court with Mrs. Olley as the defendant, and the London Provincial and South Western Bank, Ltd., of 3, Bank Buildings, as the garnishees. The plaintiff had garnisheed the account at the bank, and the balance of the account and the court costs had been paid. They now made an application for fees and costs beyond the fees and costs paid into court, properly incurred by the plaintiff before the receipt of notice of payment into court, to be paid by the garnishees, as they had not paid the money within five days of the hearing—four days, in fact. Judge Cluer said he could not ask the garnishees to pay the costs, as they had actually paid the money into court. Plaintiff's solicitor said he was not asking for costs in full, but the fact that the garnishees paid late had caused him a lot of work and loss of time, which he was entitled to be paid for, and he suggested £1 1s. anyway. The lady, he admitted, sent a cheque, but when he went to the bank they would not cash it. Judge Cluer: Of course they would not; you had garnisheed the account. A representative of the bank said he saw the solicitor on the last day before paying in. They were terribly busy and the solicitor said it did not matter, and now he was asking for costs. Plaintiff's solicitor denied this. Judge Cluer said that garnishees were in a difficult position and he did not think they ought to be made to pay the costs. Any costs incurred, if any, ought to be paid by the defendant. Garnishees were always in such a delicate position that they should not be called upon to meet any costs. It had to be considered the amount of work they had to do. Plaintiff's solicitor: And look at the work I have done. I actually prepared brief for counsel. Judge Cluer: Then you shouldn't have done it. All I shall order is that the money shall be paid out of court to the plaintiff, with no costs against the garnishees.

Notice is given that at the expiration of three months from September 27, the name of the Claude Studios Limited will, unless cause is shown to the contrary, be struck off the Register of Joint Stock Companies, and the company will be dissolved.

NEW COMPANIES.

Vernon Daines, Ltd.—This private company was registered on September 26. with a capital of £2,000 in £1 shares. Object: Photographers, cinematographers, art dealers, camera, lens, optical apparatus, film, postcard album and mount manufacturers, etc. Agreement between Vernon R. Daines and J. A. Brooke. The subscribers (each with one share) are:—V. R. Daines, 17, Lennox Avenue, Gravesend, photographer; Mrs. A. M. Webb, Brooklands, Dartford, Kent; J. A. Brooke, Fairview, Old Road, East Gravesend, clerk. The first directors are: V. R. Daines, Mrs. A. M. Webb, and J. A. Brooke. Registered office: 23, Hythe Street, Dartford, Kent.

Fred Abson, Ltd.—This private company was registered on Sept. 26, with a capital of £4,000 in £1 shares. Objects: Toy, fancy goods, dealers in general chemists goods, photographers, photographic printers, etc. Agreement with E. A. Briggs. The subscribers (each with one share) are:—Elizabeth A. Briggs, 3, Jubilee Place, Castleford, merchant; E. C. Briggs, same address, butcher. The first directors are:—Permanent managing directors, Elizabeth A. Briggs and E. C. Briggs. Registered Office:—Bradley Street, Castleford, Yorks.

News and Notes.

Cripplegate Photographic Classes.—The courses of instruction in photography, by Mr. John H. Gear, at the Cripplegate Institute opened on Wednesday evening last, October 2. Those who are able to take advantage of them will appreciate the guidance of so competent and experienced an instructor as Mr. Gear. The requirements of photographers for the R.A.F. Photo-Secton are a feature.

Hammersmith, Hampshire House, Photographic Society.—An excellent and representative exhibition of the work of Mr. H. Essenhigh Corke is now on view at Hampshire House, Hoy Lane, Hammersmith. Between sixty and seventy pictures are shown, consisting mainly of landscape and figure subjects. A detailed description or analysis would be of but little value to those who do not embrace the opportunity of inspecting them, and to those who do pay a visit to Hampshire House appreciative comment would be superfluous. Though such distinction is not unique, Mr. Corke has achieved the honour of having been the recipient of the medal of the Royal Photographic Society upon two occasions; once for colour work (an autochrome) and again last year for his admirable portrait of Frank Ferner, Esq. Visitors are cordially invited to the show, which is open free every day for about a month from 2 p.m. until dusk.

Nottingham Photograph Survey.—The Nottingham Photographic Record, now in course of formation in the Public Reference Library, has recently been enriched by the gift of over 200 local photographs, engravings, prints, maps, etc., from the collection of the late Mr. Edward Sutton, presented by Mr. and Mrs. Amphlett. These include reproductions of illustrations of the old town generally, pictures of the Castle, Market Place, Trent Bridge, St. Peter's Gate, the "House of Correction," St. Ann's Well, churches, crosses, buildings, streets and old yards, and various other prints of disappeared and disappearing Nottingham. Many of these are exhibited in the case in the Reference Library. Mr. F. Carnell has given a fine etching of old Trent Bridge, as it appeared fifty years ago, and one of the old Midland Railway crossing. Mr. H. C. Roe has presented a fine photogravure of old Trent Bridge, and two valuable Byron prints.

Royal Photographic Society Exhibition Lectures.—The following is the programme of lectures to be delivered on Tuesday and Friday evenings at 7 p.m. during the society's exhibition at 35, Russell Square, London, W.C. The exhibition is open daily from 11 a.m. until 9 p.m., commencing Monday, October 14, until Saturday, November 30. Admission is free to exhibition and lectures.

Tuesday, October 15.—"On the Use of the Interferometer in Testing Optical Systems." F. Twyman.

Friday, October 18.—Affiliation Red Book Night.

Tuesday, October 22.—"Control in Bromoil." G. B. Clifton.

Friday, October 25.—"Two Great Cathedrals in Northern France." E. W. Harvey Piper.

Tuesday, October 29.—"Stick and Leaf Insects." Dr. G. H. Rodman.

Friday, November 1.—"The British Battle Front in Palestine." Major Alan Burgoyne.

Tuesday, November 5.—"How to Work with Colour Sensitive Plates." A. J. Bull.

Friday, November 8.—"Nature's Flytraps." F. Martin Duncan.

Tuesday, November 12.—Annual address by the President.

Friday, November 15.—"The Romance of Ancient Brasses." W. E. Gawthorp.

Tuesday, November 19.—"Personal Practice in Lantern-Slide Making." J. Dudley Johnston.

Friday, November 22.—"British Malaya." W. J. Roffey.

Tuesday, November 26.—"The Gum-bichromate Process with a New Colloid." H. S. Starnes.

Friday, November 30.—"Four Great Churches: Winchester, Durham, Gloucester, and St. Remi (Rheims)." H. W. Bennett.

Correspondence.

**** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

**** We do not undertake responsibility for the opinions expressed by our correspondents.*

GLAZING PRINTS BOTH SIDES—A METHOD WANTED.

To the Editors.

Gentlemen,—I am an official photographer, and the latest order from a Government Department is "photographs to be glossy on *both sides*." Can you or any of your readers help me out of the difficulty? Is there a firm that makes strip postcard glossy on both sides? I shall be glad of any information. I am, yours faithfully,

A. DICKIN.

The Studio, Stafford.

[We shall be glad to hear from any readers who have had occasion to make prints glazed on both sides, and to publish their communications with any suggestions of our own next week.—Eds. "B.J."]

ADVANCE IN THE PRICE OF PLATES.

To the Editors.

Gentlemen,—Although several weeks have now passed since correspondents have written to your valuable paper re the rise in price of plates and conditions regarding same, I am surprised to note that the makers as a body, or individually, have not answered any of the criticisms which I think any fair-minded person would admit are just.

I cannot help feeling that the absence of any letters from them must be for one of two reasons, viz.:—Their inability to justify their action, or their utter indifference to criticism.

Whichever of the two is the case, I think it is enough for us all to realise that in future we cannot have the confidence we used to have in the makers.

I should like to ask them a few plain questions, but doubt if they will answer them.

1. If glass was the cause of rise in price, why did they not *ask* users to co-operate with them re returning old negatives, and so enable a fair arrangement to both to be arrived at?

2. Why have they set the price for returned negatives at a lower price than that paid previously, especially as, according to their own argument, glass is getting more scarce, consequently more valuable?

3. Why do they now refuse varnished negatives, whereas they used to take them?

4. Why do we now have to pay carriage when previously buyers paid it?

5. Why have 6 by 4½ and 15 by 10 cm. plates been raised to same price as 6½ by 4¾? They used not to be.

With regard to all the remarks re P.P.A. that have appeared in letters: whilst no association can be expected to do the impossible, it is only fair to admit that it has done something for the benefit of the profession. At the same time I do not think it has by any means done all it might.

Now is opportunity for the council to show the members what its strength is by securing some improvement in this plate trouble.

I am sure if they succeed that they will do themselves an immense amount of good in the eyes of the profession, and so gain the confidence which, judging by letters in the "B.J.," they have not now got.

If that was achieved, then would be the time to go ahead and develop the power and scope of the Association, and I for one would be quite willing to pay 10s. 6d. or £1 1s. annual subscription and am sure plenty of others would, providing we felt that these lines were adopted, and up to date ideas pushed.—PROFESSIONAL.

PICTORIAL CARD POSTAGE RATES.

To the Editors.

Gentlemen,—There is a misconception abroad as to what may be done with regard to the new law affecting the stamping of postcards, and an impression that you may run a coach and horses through it. We have recently received from a customer for our postcards a little slip stating that "it was not generally known that a postcard bearing a conventional phrase of not more than five words might be sent for a halfpenny." This, as being likely to have a very beneficent effect, if true, upon our own postcard sales, we sought verification for by sending to the local G.P.O., and the reply was that the statement was untrue, and that postcards must bear a penny stamp.

Since then I have come across a fuller and interesting statement concerning this matter—one of great importance to postcard publishers and retailers—in the private journal of the trade federation of which I am a member.

I hope that the probably great length of this communication may be deemed justified by you in view of the importance of the subject.

The following are the salient points from the article in question:—

"It is not generally realised that, though a postcard now requires a penny stamp, printed matter on a postcard can still go for a halfpenny; though even in London districts such cards have been surcharged. The Postmaster-General himself made this quite clear by a statement in the House in reply to a question:—

"'A circular admissible at the printed paper rate does not become inadmissible if printed on a card marked "postcard" and sent through the post. But it is advisable that the word "postcard" should, before posting, be replaced by "printed paper" in order that Post Office servants may not be misled. The supposition that the use of an open envelope is essential before a circular printed upon a card can be admitted to the printed paper rate is entirely erroneous.

"'It would, however, save time in the P.O. and prevent mistakes and surcharges if care were taken to put "printed matter" on the address side of the card in such cases.'

"The Postmaster-General also sent the following in reply to a request for a decision on the question:—

"'Sir,—I beg to inform you that your card (a bookseller's report) would be transmissible at the inland printed papers rate of a halfpenny as a "quotation for goods," but the printed words, 'I can supply,' do not render the document easily recognisable as an appropriate printed form. A better wording would be "I can quote the following price" or "prices." Any card admissible at the inland paper rate should not bear the words "post card." If they are already printed on a card they should be struck out. It is desirable also that such a card should bear the words "printed paper" at the top left hand corner of the front.—I am, etc.'

"In the case of Christmas and other similar cards five words of a conventional nature may, it is understood, appear on the left of the address on the address side."

So you see from the above that the case is still an ambiguous one, so far as concerns the sending of pictorial postcards which are not Christmas postcards, even if these bear only five words of a conventional nature.

I am taking the matter up again direct with London, and if I elicit anything of a useful nature you shall hear from me.

There is one outcome of the new rule, however, which seems to be that the wiser course nowadays is to omit the fateful word "postcard" from the address side; though whether one is justified in evading, even lawfully, taxes of this nature, intended as they are to increase individual contributions towards the war cost, is another matter, depending upon the altruism of each individual.

HAROLD HOOD.

Middlesbrough, September 28.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

A. M.—1. No objection whatever to a lead-lined tank for development of negatives. 2. We think there can be no objection to your advertising glacial acetic acid for sale. We do not know how you can dispose of it otherwise.

F. A.—The solution used for coating collotype plates is nothing more than gelatine and bichromate of potash, but the preparation of the plates is attended by many difficulties, especially in this climate. For details we would refer you to Wilkinson's "Photo-Mechanical Processes" (Hampton and Sons).

MICRO.—It is not necessary to use a microscope for very low-power work. If you have a camera with a long Extension and a very short focus lens you can get fair magnification—for example, with a 3-inch lens and twenty-seven inch bellows you can get an enlargement of eight diameters.

I. H.—Yours is not a case where exemption may be claimed on the ground of your photographic work being of national importance, but as the proprietor of a one-man business and low medical grading we should say you stand a very good chance of exemption from military service so long as you continue in the aeroplane works.

W. E.—Messrs. Marion and Co. have recently introduced a simple form of reflector for use with their arc lamps. It consists of two white screens about 42 inches square placed at right angles. This appears to answer very well. There is nothing to prevent your opening on Sunday except an old Act of Charles II., of which nobody takes any notice now. You will have to observe the Shops Act, and not work your staff too many days.

M. K.—The prismatic binoculars embrace a wider field and usually are of higher magnifying power than the ordinary field glass, but are not so luminous. The prismatic glasses require careful handling, as the prisms are easily deranged: hence you must be very cautious when buying at second-hand. The firms you mention can be depended upon to deal fairly. We should prefer a prismatic for general use, and ×8 is the most serviceable power.

G. E.—1. There is not much to choose between the lamps. Exposure depends upon the lens, plate speed, and distance of light from the sitter. Exposures should be about the same as for daylight. 2. Application for a licence should be made in writing to the Director of National Service, 7, Saville Place, Newcastle-on-Tyne, simply stating your present business (if any), and the particular place in which you wish to open a new business.

D. E.—You would require at least 3,000 c.p. for your work, and we should recommend four 1,000 c.p. lamps, so that you would have a little in reserve for children or nervous sitters. We prefer these to the arc, as the light is more steady, it is silent, the current consumption is less, and there is not the bother with carbons. If you write the General Electric Company, 67, Queen Victoria Street, E.C.4, they will send you their catalogue of lamps for photography.

F. N.—1. Deducting the rebate on negative you wish to enlarge two diameters. The distances from the diaphragm of a 6-in. R.R. lens would be diaphragm to paper 18 in., diaphragm to negative 9 in. For other magnifications see table on page 458 of the "B.J. Almanac." 2. We cannot answer this, since so much depends on density and colour of negative, and also quality of light. A strip test in weak daylight should be made, giving 1, 2, 4, 8, 16 and 32 secs.

G. C.—We have no practical experience ourselves of making the Agfa intensifier, but it is stated in the German literature that the intensifier consists of 10 parts bichloride of mercury, 8 parts potassium sulphocyanide (or 6 parts ammonium sulphocyanide) dissolved in 100 parts of water to form the stock solution which is diluted with 10 times its bulk of water for use. In making up the stock solution it is directed to add the sulphocyanide as a very strong solution to the previously made solution of bichloride, adding the sulphocyanide until a colourless solution results; but without having tried it we should imagine that some considerable experience is required to compound the intensifier in its best working condition.

S. E.—1. We think you will be well advised to adopt electric light at once, and there is nothing simpler to fit and cheaper to run than the half-watt lamps "Atmos" type, of which you can get full particulars from the General Electric Company, 67, Queen Victoria Street, E.C.4. Any class of lighting, smooth or powerful, can be secured with these. Do not go in for one large lamp: three 1,000 c.p. lamps are easier to manage and make shorter exposures possible than one 3,000 c.p. A great deal of good work in heads and busts can be done by the light of an ordinary window, but for full-lengths you want a higher light, so that the electric lamp in some form is necessary. 2. We should rather disabuse you from the idea that portrait photography is a restful occupation. In our experience it is strenuous work and calls for good physique.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as the acceptance of "returns" by a publisher is now prohibited by the Government. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 3049. Vol. LXV. FRIDAY, OCTOBER 11, 1918. Price Twopence.

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SUMMARY.

There would appear to be great possibilities in the application of lithography to the colour printing of textile fabrics. In a paper, which we reprint by permission from the Journal of the Society of Dyers and Colourists, Mr. R. B. Fishenden describes the methods employed, and points out that, although the use of lithography is limited to a certain number of styles, it has other advantages, one of which is the wider range of colours available over ordinary methods of calico printing. (P. 456.)

There have been many attempts to produce a satisfactory mechanical retoucher, but so far without a great deal of success. We reprint from "Camera Craft" an account of one which is said to act perfectly and rapidly. (P. 456.)

In paying a tribute to the work of the Photo Section of the Royal Air Force there is occasion to point out that photographers are still wanted for this branch of the Service. In order that applications by those wishing to engage in this Service may follow as direct a course as possible, we have ascertained from the R.A.F. and here publish the address to which applications should be made, together with particulars of the ratings of men who are acceptable and of the character of the work. (P. 454.)

Portrait negatives taken against the light are frequently foggy. A practical method of avoiding this trouble is given on page 454.

Individuals or firms who are not natural-born British subjects are now forbidden to carry on business in any other name than that by which they traded or were known at the commencement of war, unless permission is obtained from the Secretary of State. (P. 462.)

The report of the Technical Optics Committee, covering the first fifteen months' work, appears on page 458.

Although many photographers do a fair amount of work with the theatrical profession, there is still much to be done, especially in the provinces. Some helpful hints in this connection are given on page 460.

Glazing prints on both sides and German formulæ published with intent to mislead are the subjects of letters on page 463.

Some useful notes on the control of colour when toning with the hypo-alum bath, with a simple formula for a hardening fixing bath, will be found on page 458.

At the present season many operators complain of thin images. The necessary precautions to be observed in this connection are summarised on page 453.

Some suggestions as to the use of the ferro-prussiate process for prints of a technical character, or for an illustrated index, are made on page 454.

Mr. [illegible], a well-known expert in portraiture, delivered an interesting lecture on front lighting before the South London Photographic Society. (P. 461.)

A neat finish for some classes of prints is described on page 45[illegible].

EX CATHEDRA.

"B. J." Advertisements. We desire to give all the prominence we can to a warning. During last week our publishers were the recipients of a letter insinuating that certain of the people who advertise in our columns for employment in photographic establishments have no real existence. We interpret the letter as suggesting that a number of such advertisements are invented and inserted to represent actual advertisers. In order that we may leave no doubt as to our attitude towards any such statement or innuendo, we challenge anyone to make such a charge in plain words and to substantiate it. Our publishers are prepared to lay their books and documents before any disinterested third party nominated by anyone who prefers the charge and approved by our publishers, and to prove to such third party that every advertisement inserted is a genuine one. This offer is made in special reference to the quarter whence the recent innuendo apparently emanates. We hope that the announcement of this challenge will be sufficient to indicate the vigour with which we shall pursue damaging statements of this character. Any repetition of them which comes to our notice will be immediately the subject of legal proceedings.

* * *

Temperature, Detail and Density. Now that the colder days are approaching, the worker will do well to look to the temperature of his solutions, neglect of which is a common, if unsuspected, cause of trouble. Some time ago we were consulted as to some negatives which had all the indications of under-exposure. They were very thin. Though upon examination it was found that there was abundant shadow detail, which gave the lie to this supposition. It was subsequently discovered that the developer was kept in a stock solution in a cold dark-room, and doubtless when used was much below its normal temperature, thus producing the weak negatives. With some formulæ a low temperature causes the solution to become almost inactive, and the negatives will be found to lack both detail and density. Those who develop by the time and temperature method know that development at a higher temperature will give negatives of more "pluck," than those given a longer time with a colder solution. In order to overcome the general lack of contrast in winter negatives it is a good plan to warm the developer up to say 75° F. if the plates employed will stand it, without frilling; though if the fixing bath (which is likely to be colder than the developer) is treated in the same way, the frilling danger is largely eliminated. With some brands of plates there is a tendency towards chemical fog, but a few drops of 10 per cent. bromide solution will prevent this. Much the same may be said of development papers. We know of one brand that will never give satisfactory results if the developing solution is less than 50 F., but most workers give very little attention to such matters when developing bromide prints. Trouble in this respect is the more likely to be met with during the early autumn, before the dark-room is properly warmed, as it should be during the winter, a reminder which perhaps will suggest an explanation of failures at the present time.

* * *

Blue Prints. The value of ferro-prussiate paper for printing from ordinary negatives does not seem to be so generally appreciated as it might be. For anything in the nature of illustrated indexing and for many technical purposes it answers perfectly, at a minimum of expense and labour. One maker of lantern slides of our acquaintance has several albums arranged so as to show blue prints of his various sets of slides, thus saving much handling, with risk of breakage, of the actual slides. One of our most celebrated cartoonists, who relied upon photographs for details of dress and equipment, had blue prints carefully arranged as an illustrated card index of thousands of negatives, while in other cases the same medium has been employed for making workshop records of various fittings and parts, which looked quite at home with the blue prints of the working drawings of the same job. It is a moot point whether blue prints could be used as portrait proofs. There would certainly be an advantage if it were possible, because, although the prints are not liable to fade by exposure to light, they could not be used as additional copies without payment. It is just possible, though not satisfactory, to convert the blue image into other colours, but once this is admitted the simplicity of the process is gone, and it is quite as easy and almost as cheap to use a self-toning or bromide paper.

* * *

Ruled Borders. Portraitists who are desirous of departing from the ordinary type of "sketch" mounting might do worse than revert to a style which was used to a small extent in the early days of sketch work, and was adapted from the borders of some of the delicate French engravings of more than a century ago. It consists of a border—either on the mount or upon the print itself if there is sufficient margin—of fine lines at varying distances. The space between some of them is filled in with a delicate water-colour tint, grey, fawn or other natural tints being the safest. More pronounced colours such as pale pink, green, or blue may be used, but much taste is then called for to avoid a tawdry appearance. If the print is mounted the first of the series of surrounding lines should commence close to the edge of the print, and may extend from there to a total width of half an inch for small work up to an inch and a-half for larger sizes. The only drawback is that the work must be done by hand and carefully done or the result will be terrible; but, on the other hand, this difficulty prevents the style from becoming vulgarised. To those wishful to try it we may suggest that a proper architect's ruling pen is essential, and that waterproof drawing inks must be used for the lines. All the necessary materials can be obtained from any good artists' colourman, but if there is any difficulty in getting the inks locally they can be got from draughtsmens' supply people, like Stanley, of Holborn, or Halden, of Westminster.

* * *

Shading the Lens. We were rather surprised on looking through some portrait negatives which had been taken with the camera facing the light that they were all more or less foggy. They printed fairly well, but slowly, and certainly did not give as full a scale of tones as if the fog had been absent. On remarking upon this, the operator said that "it was a pity the 'Rembrandt' negatives always came like that." A suggestion that he should shade the lens was met by the reply that if he did that he altered the lighting. This, we pointed out, was quite a wrong idea, as the shading could all be done between the sitter and the lens, so that the lighting was in no way interfered with. The best way of doing this is to use an ordinary circular head-screen, which may be temporarily covered with dark material, and to place this in such a position between lens and sitters that when the eye is in front of the lens the observer cannot see the source of illumination. This result can be secured easily without interfering with the view of the sitter, but to make sure of this a final glance should be given at the focussing screen. The ordinary lens-hood or canopy is not sufficient, as it moves with the lens. What is needed is a movable screen, which can be so placed that it shades off the window, and its image just clears the edge of the plate.

THE PHOTOGRAPHIC AIR SERVICE.

Among the forces which before our eyes are proving instrumental in effecting the downfall of Prussian militarism, photographers of all people should have special pride in according an honoured place to the photographic air service. The part which photography has played in military operations has by this time, one would suppose, been sufficiently emphasised by its constant reiteration in official communiqués. In these the taking of a thousand or more photographs, by the prominence of its mention in a despatch, ranks with an infantry raid or with an advance to some contested point. And that this should be so is no more than bare justice to the flying men who risk their lives in the making of the negatives. Their work, too, has its necessary complement in the highly organised service by which the negatives are printed or enlarged, and thus made available within an incredibly short time for the use of the military staff. And so no excuse is needed for emphasising once again in these columns the very great and real part which photography has played in the successes of the Entente armies.

In this service photographers who before the war were not in any way connected with the Army have been honourably associated—in fact, have been almost wholly responsible for the organisation of photography from the air. Their work has consisted in the design of appliances, establishing systems of dealing with the printing and enlarging of negatives in accordance with Army requirements and in securing and training men to carry out those systems. The appliances have proved good, as evidenced by their having been copied by the Germans: the systems have shown themselves equal to the very great demands made upon them: and the men who have carried them out, men drawn largely from the ranks of photographic assistants, have shown enthusiasm in contributing their knowledge and experience to the common cause of destroying Prussian militarism. Yet great as has become the work of the Photo Section of the Air Service the recent definite turn of events in France calls for a further extension of it. It appears natural that as the Germans are pushed back from any of the territories they have occupied photographic disclosures of their doings are called for on a larger scale and at more frequent intervals. Hence there is good reason for us to emphasise that every photographer liable for service should be in the Photo Section of the Air Service, and should take steps to get there, for it is there that a demand still exists for a considerable number of suitable men. What is a "suitable" man, and how he should get into the Photo Section are two matters which therefore call for a few words. "Suitable" in this connection means a man whose medical rating (a comparatively recent one) is preferably Grade II., certainly not Grade I., except in the case of men over thirty-five years of age: preferably not Grade III., except in the case of men who have not any physical defect incapacitating them from dark-room work and moderate exercise. Coupled with his medical rating must be a reasonable proficiency in practical photographic work, such as bromide printing and enlarging. A man of this experience and rated as specified above is a "suitable" man.

As to the process of getting into the Photo Section, we have always thought that the recruiting of photographers for work in accordance with their qualifications lacked directness, and have therefore made inquiries with the object of finding out whether men due for military service may come directly and immediately in touch with the section. As a result we learn that inquiries may be addressed to—

The Secretary,
(G 5—Room 609),
Air Ministry,
Strand,
London, W.C.2.

In writing, particulars should be given of age, medical rating, and photographic experience—i.e., description of work and time engaged in it. Men who are accepted enter the service as second-class privates at the pay of 1s. 6d. per day. They first receive a course of training, followed by a term at a practice camp, before proceeding to France or otherwise overseas, where their work consists of developing, printing, and enlarging as distinguished from the exposure of negatives from aeroplanes. It is our hope that these notes may be the means of setting the salient facts before readers, other than those addressing inquiries to us, who need them, and that in consequence the Photo Section may obtain its needed reinforcement from those most capable of rendering this highly essential form of military service.

As regards those photographers who are at present in the Army, to many of whom, as we know, the "B.J." comes week by week, it may be admissible to suggest that they may seek transfer to the Photographic Section of the R.A.F. Whether that transfer will be granted is, of course, a very doubtful matter, depending upon the services which a man is rendering, and apparently also upon the particular view of a Commanding Officer. We have heard of cases where a man with photographic experience was heartily reprimanded for not having disclosed such experience in the way of seeking transfer to where it could be utilised. On the other hand, there are no doubt many photographers who have so thoroughly made good in an entirely different occupation that their transfer would be negatived by the authorities. At any rate, it should be made clear that there is only one way of applying for such transfer, and that is through a man's own Commanding Officer. Evidently correspondents who have written to us asking for our suggestions as to how it could be effected otherwise are uninformed of the very strict routine of the Army in this matter.

AN EXPERIENCE OF MECHANICAL RETOUCHING.

[Machines for the mechanical movement of the retouching lead on the negative have occupied the attention of several inventors. There was one some six or seven years ago which, we believe, was tentatively taken up by a leading firm, but, so far as we recollect, was not placed on the market. In our issues of the 20th and 27th of September particulars appeared of the invention for the same purpose patented by Mr. A. J. Blackburn, and since then we have come across the following notes in our San Franciscan contemporary "Camera Craft," which provide a contribution, from the professional photographer's standpoint, to the same subject. The mechanical problem of applying lead to the negative by a rotating pencil should not be a difficult one, but as is easily understood and is emphasised by Mr. [illegible], convenience in handling is a factor of importance in the successful use of such an appliance.—Eds. "B.J."]

There is no denying the fact that the retouching of portrait negatives is a necessity, and it will, no doubt, continue to be such as long as photography is practised and there is any desire that the portrait made thereby convey to the beholder an impression that is fairly truthful and in accordance with what the eyes and mind perceive in the face of the original subject. It is a well-known fact that photography emphasises discolorations or variations in colour in the skin that are barely or not at all perceptible to the eye. Cases are on record where the approach of smallpox and similar diseases have been disclosed by photographs showing the characteristic spots before their appearance could be otherwise detected. In the case of wrinkles and other depressions, the tendency of the photographic plate greatly to emphasise them requires no comment. We have but to photograph an ordinary sheet of paper to realise that the negative can show granularity and irregularity that the eye fails to call to our attention, and when it is remembered that the skin is filled with minute blood vessels and carries colouring pigments that are much more pronounced in shadow than they are in strong light, we can understand the reason why these depressions in shadow are so strongly and unnaturally emphasised in our negatives.

The use of orthochromatic plates helps to some extent, and the employment of a soft-focus lens is another means of minimising the difficulty, but neither of these is a complete remedy, while the increased exposure necessitated by the first, and the loss of detail and rather fuzzy effect produced by the latter, is not always satisfactory.

Retouching, as ordinarily done, is work that not only requires considerable skill, but it is tedious and time-consuming, to say nothing of the strain imposed upon the eyes and the nerves, particularly if the work is continuous.

For many years I have hoped to find some relief from these drawbacks, and while I have tried the several retouching machines offered for the purpose during the last twenty-five years, I have not been satisfied with their performance, although the measure of success they achieved had the result of convincing me that a satisfactory retouching machine was a possibility that would ultimately become an accomplished fact. Those tried all had the advantage that more lead could be applied when necessary, as the film did not become glazed and refuse to take, as is the case in hand-retouching, and all had the advantage of greater speed and smoothness of work. With the vibrating of the lead, a feature characteristic of them all, the lead has a rotary motion and strikes the film in a new spot with each vibration, both of which are impossible in hand work, and therefore the lead sticks and builds up much more satisfactorily. Some of the machines tried were unnatural and unwieldy in the hand; others required that they be held at a particular angle not always easy to maintain in actual work;

and still others were so arranged that the vibration of the lead was secured only by the machine causing the hand to vibrate at the same time and at the same high speed.

One of the machines tried, the most satisfactory to use of them all, was discarded rather reluctantly, simply because it was utterly impossible to keep it in proper working condition. Through this fault it was soon withdrawn from the market; in fact, I do not remember having ever seen it advertised, it having been brought to my attention by a demonstrator friend who knew of my desire to try any device of this kind that promised to do away with the irksome handwork in retouching.

I believe, however, that I have at last found an electrically operated retouching machine that fulfils all of the requirements, and I know that it is far in advance of any others that have been on the market for a short time in the years that have passed. The machine itself, the holder that carries the lead, consists of a loose outer sleeve-holder of a convenient size and weight that does not inconvenience the worker by reason of its dissimilarity to an ordinary retouching pencil. The loose sleeve that the hand holds gives perfect control and avoids any vibration other than that of the inner, or lead-holding part. As the machine can be so set that the vibration is fast or slow, as desired, the effect secured is bound to be perfectly uniform, and in accordance with the work that one wishes to do. It is, of course, necessary for the worker using one of these retouching machines for the first time, to become accustomed to it, but it takes only a very short time to do this. I find that some pick up the knack of using the machine in less than two weeks, while others require a little longer, although the knack comes to anyone with a little practice. A poor retoucher, one who has never been able to do work successfully by hand, and the person learning retouching, is inclined to become expert with the machine in shorter time than is the old retoucher to whom the particular touch used has become a sort of second nature.

The machine requires only that the user is capable of judging where the lead should be applied, and that he has devoted the little time necessary to secure perfect control of the lead. Judgment as to what is necessary, and the easily acquired knack of using the machine, are all that is necessary to enable one to more than double the amount of work that he can turn out. I find the machine a wonderful help to me in thus increasing the amount of work done, and the rest and relief that it gives my eyes is most refreshing and gratifying. Using the machine one does not have to watch the effect of the lead, one does not have to worry about whether it is sticking or not in the heavy shadows, but simply goes ahead with a knowledge that the lead is being smoothly and uniformly applied.

Myself a rather fast retoucher by the hand method, and disinclined to rush work with the machine, preferring to enjoy the relief and comfort that it gives me, I find myself doing only about double the amount of my former work. But I have letters from others who have, on my recommendation, used the machine only three or four weeks, and they claim that they do from three to five times the work by its use. The machine in question, the one I find so satisfactory, is the Green's Lightning Retoucher, the invention of Roland E. Green, of Hastings, Michigan, a member of the National Association, and one of the best known photographers in his state. Mr. Green, I learned, has, like myself, long had the idea that in order that a machine of this kind prove a success, the lead should be applied to the film by a side rotary motion, and that there should be no unusual weight on the holder to interfere with its ease and natural control by the hand. His machine has been perfected along this line; and, as it is sold on a money-back guarantee, I feel quite sure that I shall be doing a kindness to my fellow-workers by calling their attention to its merits. They will, I know, thank me for so doing, just as I have thanked the kindly disposed demonstrator, himself an expert retoucher, who first brought this machine to my attention.

One of my fellow photographers writes me that he has become so favourably disposed towards the machine, and the rapidity with which he can do the work, that he is contemplating selling his business and opening a studio devoted to retouching alone. He believes that he can make money more easily by so doing, and not be tied down so closely to his work. Another friend to whom I recommended the machine, is more than pleased, because it enables him to produce a stipple that is entirely free from the scratchiness which he has never been able to avoid in his hand-work, to say nothing of the increased speed in production. Still another friend, one who conducts a studio devoted exclusively to commercial photography, is highly pleased, and says that the results secured exceed his anticipation. This last phase of the work I have not touched upon, for the reason that commercial photography is entirely out of my line. I know, however, that speed is a desideratum; and, as the turning of a small thumb-screw on the vibrator box at the side of the retouching desk adjusts the machine to fine, medium, or coarse effects, the results secured should be most gratifying.

Any photographer who desires to increase the quality of his work and lessen the time that is required to turn it out, to say nothing of the ease and comfort with which the work is done, should possess himself of one of these mechanical retouchers, now that a satisfactory form is obtainable.

O. S. Stebbins.

LITHOGRAPHIC TEXTILE PRINTING.

(A paper read before the Society of Dyers and Colourists.)

For the printing of textile fabrics innumerable ingenious processes have been employed, from simple block printing to stencilling and the use of intaglio engraved cylinders. Lithographic printing is different from these both in the character of the results and in the manner of their production. The early block printing of the calico printer was done, as the name suggests, from flat wooden slabs having upon them a design made of bent strips of brass shaped to the outlines of the pattern. Any portions required to print solid were usually filled in with felt, and the edges of the brass strips ground level before the block was printed. The method of printing was to apply a suitable printing colour to the block, and afterwards to transfer this to the fabric by the application of pressure.

There are three broad classes into which all printing methods may be divided, namely, relief, intaglio, and surface printing. Block printing belongs to the first class—relief printing surface—similar in essentials to book printing from type. The second process—intaglio—is the one so widely employed in the printing of calico and wall-paper. It is exactly the reverse of relief printing, the sunken portions being printed from. The printing colour is "furnished" on to an engraved cylinder, the excess being removed by a steel knife or "doctor" and returned to the colour box. The colour is transferred to the material to be printed by the application of a soft blanket pressure.

In lithography there is no difference in the height of the printing surface. Speaking in general terms, the method is as follows:—A design in greasy ink is prepared upon a porous surface such as limestone or roughened metal, which will retain moisture. If the damp surface be supplied with a film of a varnish printing colour, the clean portions will repel it, whilst the greasy portions will be reinforced. Impressions may be obtained from this ink design as in relief printing.

The conditions for the satisfactory printing of paper differ widely from those required in the printing of fabrics. In the former, it is required to produce upon the paper a laterally transposed replica of the subject, the image being solid and opaque. There is no difficulty in obtaining this kind of result with suitable printing ink when printing from hard surfaces such as type or a lithographic stone, because an extremely thin film of the ink may be made to carry a sufficient quantity of the pigment to produce a solid colour.

But in the printing of fabrics it is usually required to apply a considerable volume of the printing colour to the material. This is done in the case of block printing by the ingenious device of "felting" the solids. In intaglio printing the cavities are etched sufficiently deep to carry as large a volume of the printing colour as required.

It will be seen that in lithography, apparently, there will be difficulty in causing the printing surface to carry the large volume of colour required for fabric printing. The difficulty is not found to exist in practice; a sufficient volume of ink may be supplied to a lithographic image, but such a volume when printing on paper would cause the printing colour to spread and so produce thickened impressions and a blurred image. In fabric printing, however, the unusual amount of colour is absorbed by the cloth, producing the desired effect.

Lithography is essentially a chemical process. The printing surface was originally limestone, but aluminium and zinc are now also employed. If an image in a greasy material be prepared on such a surface and damped, a few impressions may be obtained in the manner previously described, but very soon the image will be lost or become thickened. In order to make the image of a permanent character a chemical treatment is necessary. The "greasy material" or ink used in the preparation of the design consists essentially of a drying oil, wax, soap, and a black pigment. This may be applied either directly to the printing surface or to paper having a soluble coating—transfer paper—and transferred thence to the printing surface. If the image so produced be treated with dilute nitric acid the fatty acid of the soap is set free and probably forms a salt with the lime of the stone. The bare parts of the stone are converted at the same time to calcium nitrate, which is capable of retaining moisture more readily than the carbonate. The stone is also treated with a solution of gum arabic, which appears to form an aggregate with the particles of calcium carbonate, possessing the property of repelling grease to a marked degree. This is only one method of preparing a chemically "sound" lithographic image, the usual methods depending more upon the grease-repelling properties of the bare portions of the surface, and the replacement of the original image by substances rich in grease, rather than upon the actual decomposition of the soap. Lithographic images upon metal are formed in an analogous way.

Showing set of finishing rollers on a trolley.

In the ordinary processes of calico printing, processes of dyeing are frequently employed, and in other cases methods involving the use of albumen or varnishes are used. The latter are the so-called "printon" processes, and it is for this kind of work that lithography is suitable. The printing ink consists of a pigment with a drying oil, such as boiled linseed, used as the medium. The fabric absorbs the medium and the pigment under suitable conditions; this may stiffen it to some extent, but where flexibility is desired a modification of the process ensures this. The varnish medium dries to an elastic skin of linoxin by a process of oxidation, so that the pigment is enclosed and protected from the air. The process of oxidation may be accelerated by the use of material such as manganese borate, or the linoleates and resinates of lead, manganese, and cobalt. Heat may be used for the same purpose.

Lithography has been used with considerable success for the printing of handkerchiefs and similar goods from flat surfaces, but the employment of thin metal plates in lithography has made so-called rotary machines practicable; these machines are widely used for paper printing, but they are not rotary in the sense that is understood by a calico printer, as the printing surface only occupies a portion of the cylinder, and continuous designs cannot be produced.

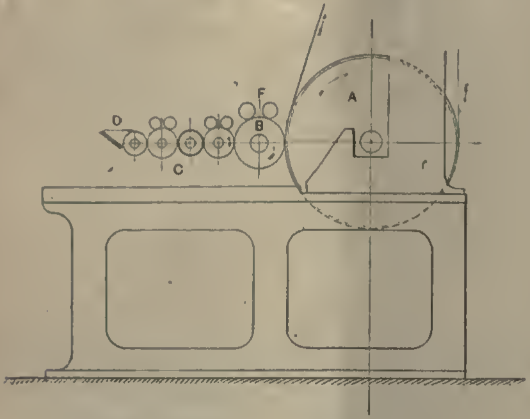
The only strictly rotary lithographic printing is done by the Hayes process wherein cylinders of zinc or aluminium are roughened and upon them continuous designs are produced, to be printed from on special machinery in the lithographic manner. The preparation of a printing cylinder is essentially different from the processes necessary for intaglio printing. In the case of spot designs, for example, a small "original" is drawn on a zinc plate, and from this a number of "transfers" in a special kind of printing ink are made, and these are placed in exactly the right position in relation to one another on a large sheet; they are then transferred to the printing cylinder on a machine specially designed for the purpose. This is the procedure for a single colour; but multi-colour is done in a similar way. Processes have also been introduced whereby this work may be done almost entirely by photographic means.

General view of Hayes' two-colour printing machine.

The use of lithography in fabric printing can only be applied to a certain number of styles, but there seems no doubt that it offers advantages. The cost of copper cylinders is obviated, and the expensive engraving is replaced by the simple transferring process. The low cost of preparing a printing cylinder reduces the expense in connection with sampling. After a design has been printed, it is quickly removed, and the cylinder rapidly prepared for use again. The small "original" plates are retained in case of re-orders. The loss of metal consequent on skimming the rollers to remove engraved designs is avoided. The necessity for holding a large stock of copper rollers is also removed.

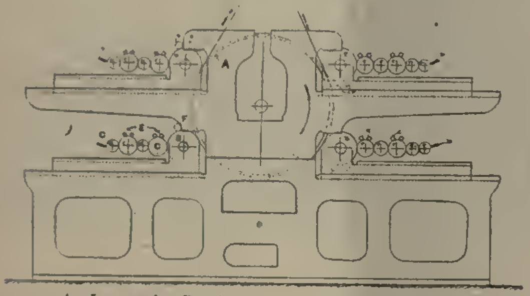
Whereas in the ordinary methods of calico printing aniline colours are mainly employed, in lithography a much wider range is available. The results have been found to be fast to soap washing, and experiments by the inventor have shown that they are considerably more permanent to light, even in the delicate shades, than those ordinarily produced. Although the cost of the printing colours ground in oil is greater, the quantity used is relatively small, so that the cost per yard is about the same. Some of the usual preliminary and subsequent processes are also obviated; all that is necessary, as a rule, is the single process of printing. Occasionally a further simple operation is necessary to complete the work.

The Hayes printing machine (see figs. 1 and 2) consists of a rubber-covered pressure bowl (A), the printing cylinder (B) revolving in contact with it. The furnishing of the printing colour is effected from the colour box (D): the colour is distributed by means of the train of rollers (C) until it reaches the inking roller, the surface speed of which is the same as that of the printing cylinder. The printing cylinder is kept damp by the rollers (F) provided for the purpose, which revolve in contact with it. This arrangement is very simple compared with ordinary lithographic printing machines. The machine so designed that the whole of the furnishing apparatus may be removed and replaced by another when a change of colour is required, the operation being completed in ten minutes. For multicolour work a larger bowl is employed, and the printing cylinders, with the furnishing apparatus, are arranged around the bowl after the manner of an ordinary calico printing machine. The speed of printing is from 60 to 80 yards per minute, and it is found that high speeds are in many respects advantageous to the process.



A—Impression Bowl
B—Printing Cylinder
C—Inking Rollers
D—Duct
E—Riding Rollers
F—Damping Rollers

Fig 1.—Hayes' patent single-colour printing machine.



A—Impression Bowl
B—Printing Cylinder
C—Inking Rollers
D—Duct
E—Riding Rollers
F—Damping Rollers

Fig. 2.—Hayes' patent four-colour calico printing machine.

An old form of lithographic printing for transfer work, named decalomanie, is very largely used for the decoration of various articles with coats-of-arms, notices, and the like. The method was to print the design required upon a paper having a water-soluble coating; in colour work the colours were printed in the reverse order. This process has been developed and patented for application to textile fabrics, the transfer being effected by heat. One of the uses of this "Briggs transfer process" is the placing of transferred tickets upon the ends of piece goods, instead of using loose tickets. The method appears to have many other possibilities.

R. B. Fishenden.

FORTHCOMING EXHIBITIONS.

September 14 to October 12.—London Salon of Photography. Hon. Secretary, 5a, Pall Mall East, S.W.

October 14 to November 30.—Royal Photographic Society. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

HYPO-ALUM TONING.

(From Rajar "Trade Notes.")

The hypo-alum toning process is becoming increasingly popular amongst photographers, and deservedly so, as it has been proved to be a most satisfactory method of toning bromide and gaslight prints, being simple to work and giving regularly good results. There is no degradation of the whites, and very little variation in the colour if the prints are properly exposed and developed.

Perhaps the only criticism levelled against the process is the tendency to give very cold sepia or purple tones, and in this connection we recently carried out some trials in order to ascertain the best method of producing warm brown tones regularly.

Differences in the proportion of hypo and alum did not make any material difference, and there was no difference in the final tone of prints that were placed direct into the hot bath and those placed in the cold solution and gradually heated up. The amount of potassium bromide in the developer appears to influence the colour, but in our opinion the final colour is mainly influenced by exposure and development. For warm tones the exposure should always be slightly on the over side, and development stopped a little short of the usual time for a black print. A print correctly exposed and fully developed to a good black will invariably give a cold purplish colour after toning. What is wanted is a nice balance maintained between exposure and development, and this is an instance where the personal skill and experience of the printer is useful.

To summarise briefly our trials we recommend the following:—

1. The amount of potassium bromide in the developer should be not less than ½ grain to the ounce (40 grains to a Winchester).
2. Exposure should be slightly on the over side.
3. Development should be stopped just short of full.
4. The old toning bath should be retained and strengthened occasionally with fresh solution.
5. The ideal print for toning should be slightly greenish in colour when it leaves the fixing bath.

Very fine tones are obtained on gaslight papers, the colour again being strongly influenced by the exposure and development.

Many of the large publishing firms are using our cards for hypo-alum toning. It is an exacting process that demands the most perfect adhesion between the paper base, its baryta coating and the emulsion, in order to resist the action of hot solutions.

A suitable fixing bath for prints that are to be toned in hypo-alum is:—

Strong sulphuric acid, 2 drms. (fl) in water, 2 ozs.
Add this to sulphite of soda, 2 ozs. in water, 6 ozs.
Pour mixture into hypo, 16 ozs. in water, 48 ozs.

Finally add to above mixture:—

Chrome alum .... 1 oz. Water ...... 8 ozs.

OPTICAL INSTRUCTION AND RESEARCH.

First Report of the Technical Optics Committee.

We, the Technical Optics Committee, constituted in pursuance of the terms of the Report (dated July 26, 1916) of the Education Committee (No. 3) adopted by the London County Council, August 1, 1916, and subsequent negotiations with the several Bodies interested, desire to present our report for the period of fifteen months ending August 31, 1918.

During the period under review the Committee has held nine meetings, the first at the Board of Education, the remainder at the Imperial College. At the first meeting the Right Hon. H. A. L. Fisher, President of the Board of Education, and Mr. H. W. Liversedge, Acting Chairman of the Council's Education Committee, inaugurated the scheme of Technical Optics, and expressed the gratification of the Board and of the Council respectively on its realisation. At the same meeting it was mutually agreed that it was unnecessary to deal with the Committee's advisory and administrative activities separately, at meetings specially convened for the respective purposes, that the Council should be represented at all meetings should it so desire, and that the Committee would be glad at all times to consider any matters raised by the Council or its representatives.

We regret that the abnormal circumstances of the times, arising out of the war, have made it impossible to do more than make what we regard as a good beginning in the work of Technical Optics. We have perforce contented ourselves with catering for the wants of existing and available students, especially bearing in mind the urgent importance of work which has an immediate and undoubted war-time value, and have temporarily postponed such further action as the full realisation of a comprehensive scheme of instruction in Technical Optics would entail. We are, however, fully seized of the profound importance of completing at an early date the organisation for such a complete scheme, and have appointed a sub-committee to report upon the whole matter, including building requirements, giving them the fullest powers of consultation and co-option either for the purpose of inquiry generally or of particular parts thereof. We hope to be in a position to deal with this question in our next report.

Meanwhile we have carefully considered the case of the Northampton Polytechnic Institute, with a view to defining its appropriate sphere of action and scope of work, and have made specific recommendations thereon to the London County Council, pending the realisation of the comprehensive scheme. We have visited the Institute and have become personally acquainted with its facilities for work in Technical Optics, and have been provided with statistics of the work done over a series of years, and of the immediate future of the students trained there.

We have put in hand an inquiry on the subject of "the Training and Education of Apprentices" in the optical industry, in the hope that it may lead to the formulation of a well considered scheme, for recommendation both to employers and employed, regarding the question as one of prime importance if the right type of employees are to be secured for the industry. In this inquiry our "Trade" and "Workers'" members are co-operating.

We attach great importance to the free passage forward from the different institutions providing instruction in Technical Optics, of students qualified for work of a higher character, and we hope that a Scholarship Scheme will render this increasingly possible. Nothing would conduce more to the harmonious working of a general scheme providing instruction and training of various grades than the existence of adequate facilities of this kind. To a limited extent students of the Northampton Polytechnic Institute have, during the year, attended special courses of lectures at the Imperial College, and arrangements have been made for Mr. S. D. Chalmers, of the Institute, to deliver to advanced students at the Imperial College a course of lectures on some subject connected with analytical optics.

In our capacity as a Committee of the Imperial College appointed by the Governing Body, we have under the Governing Body initiated and administered the Technical Optics Department of that College within the financial limits approved by them, and, as required by them, have laid before the Executive Committee of the Governing Body complete reports of all our proceedings, including recommendations for appointment.

The work of the Department has been carried on in a series of rooms and laboratories in the Physics Department of the Imperial College, temporarily placed at our disposal through the courtesy of Professor H. L. Callendar, F.R.S., by permission of the Governing Body. This arrangement, however, cannot be regarded as adequate. It is a makeshift which the abnormal circumstances arising out of the war have rendered temporarily possible. For the adequate accommodation of the department a building specially designed, constructed and equipped for its work is essential. We have remitted to a sub-committee the question of the building required for a comprehensive scheme of work and have instructed them in the first instance to consider it solely from the point of view of the requirements of the case, although, naturally, financial considerations may subsequently necessitate modification.

Considerable progress has been made in the matter of staff. We have been specially fortunate in securing the services of Mr. Frederick J. Cheshire, C.B.E., A.R.C.S., as Director of the Department and Professor of Technical Optics, and of Mr. Alexander E. Conrady, A.R.C.S., as Professor of Optical Design. Our cordial thanks are due respectively to the Board of Trade and the Ministry of Munitions, and to Messrs. W. Watson and Sons, Ltd., without whose ready co-operation this most satisfactory result would have been impossible. Other appointments made include Mr. L. C. Martin, D.I.C., A.R.C.S., B.Sc., Lecturer, Mr. W. H. M. Lauwers, and Mrs. Griffiths, Research Assistants; Miss Carroll, Technical Clerical Assistant to the Director, and sundry workshop and laboratory assistants. A scheme of staffing within the limits of the resources of the Department has been adopted, but a number of vacancies remain to be filled as opportunity serves.

Professor Cheshire's appointment as Director of the Department was subsequently approved by the London County Council, and at a later date the Governing Body of the Northampton Polytechnic Institute appointed him Honorary Head of the Technical Optics Department of that Institute.

We feel that the work done during the year, although only a beginning, has gone some little way towards meeting the urgent need of a recognised and deplorable dearth in the optical trade of this country of first-class designers and computers. We hope that when the Department settles down to its fuller work, with a systematic course of instruction extending over at least three years leading to an associateship of the College, with post-associateship work in special branches of the subject and with adequate facilities for research, a sufficient supply of men adequately trained for the higher positions in the industry will be assured, and that the Department will become the recognised centre to which appeal will be made in appropriate cases for the solution of difficult optical problems.

The completion of the first year of work of the Department provides a favourable opportunity for reviewing in some detail the work done, which may be considered under (*a*) Instruction; (*b*) Research; (*c*) War Work for Government Departments.

Instruction has been given in General Optics, Designing and Computing of Optical Systems, Workshop and Testing Room Methods, Optical Measuring Instruments, Microscope Optics, Microscope Technique and Photographic Optics, in all of which, with the exception of the last two, there has also been laboratory practice. A large proportion of the students came directly from the workshops, a fact which affords gratifying evidence of the recognition of the value of the courses by the manufacturers, and is an earnest of their support in the future; the Ministry of Munitions, the National Physical Laboratory, the Royal Observatory and the Woolwich Arsenal were well represented.

Research has been chiefly conducted by members of the staff. Mr. Martin, Lecturer, who is generally responsible for the work done in the laboratory, has been engaged on a research undertaken for the purpose of improving the design of military night-glasses, *i.e.*, of telescopes specially adapted for use in a bad light. More specifically the object of the work has been to determine what magnifying power should be given to a telescope with an object-glass of given diameter for the observation of objects under given light conditions. The problem is an urgent one for which the war is responsible. Mr. Martin has already arrived at results of great interest and value, and the work is rapidly approaching completion.

Mr. Lauwers, Research Assistant, is engaged in working out the details of a good laboratory method of applying the well-known Hartmann system of testing achromatic lenses, more especially those of large size. (This work is ancillary to that being carried on by Professor Conrady in the designing and computing of such lenses.) He has also done work on the interferometer method of testing prisms.

Mrs. Griffiths, Research Assistant, has rendered valuable assistance in the general experimental work of the Department, more particularly in a research on cementing processes for glass.

Very useful work has also been done in connection with the designing of focometric apparatus for workshop use, and in assisting manufacturers to make the same; with the testing of the efficiency of different types of range finders, and with the designing of new experiments for the lecture room and the laboratory.

War Work for Government Departments.—An increasing amount of work—both experimental and consultative—has been done for the various Government Departments responsible for the prosecution of the war.

Although we are at present sufficiently provided with funds for equipment—the sum of £5,000 in all being available, including £3,000 equipment grants from the Board of Education, the Research Department and the London County Council, and £2,000 provided by the Imperial College to meet the immediate necessities of the scheme—the difficulties in the way of obtaining the necessary apparatus are almost insuperable, and comparatively little progress would have been made had it not been for the co-operation and assistance of the manufacturers, many of whom have presented valuable pieces of machinery and apparatus. Our grateful thanks are due in this respect to the following firms for the gifts named

Messrs. Ross, Ltd., a spectrometer; Messrs. W. Watson and Sons, a microscope; Messrs. Adam Hilger, Ltd., a refractometer; Messrs. Barr and Stroud, a lathe and a milliag machine; Messrs. Taylor, Taylor and Hobson, a kit of workshop tools; Messrs. Chance Bros., a collection of samples of the optical glasses and glassware made by them; and Sir Howard Grubb, a collimator, with a large optical flat, on loan; and to the following for their promises of similar gifts:—Messrs. R. and J. Beck, Ltd. (optical bench), Messrs. F. Stanley and Co., Messrs. Troughton and Simms, Messrs. Negretti and Zambra, Messrs. E. R. Watts and Son, Messrs. J. H. Dallmeyer, Messrs. Heath and Co., Messrs. H. Hughes and Son, Messrs. J. Swift and Son, Messrs. Aldis Bros., and Mr. Charles Baker.

(Signed) A. H. D. ACLAND, Chairman.

Imperial College of Science and Technology.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Working for the Stage.

WHERE there is a theatre there is work for a photographer. Unlike certain phases of commercial work—engineering, architectural, etc.—theatrical photography does not necessitate the use of unusual apparatus and agility; the man capable of good studio routine can tackle stage work with confidence.

The first thing is to get it, and perhaps the best way is through the theatres themselves. Pick the "house" where the best "talent" is shown: get to know the management, and the rest should follow. Perhaps someone has been there before (and, as a rule, someone in every town seems to monopolise this work), but that should be no discouragement; the studio with the monopoly is not always the one most capable of giving satisfaction, and artists are not tied to patronise any one firm.

Specimens go a good way, particularly if they can be placed in or near a theatre or with the proprietors of professional apartment houses. It should be noted, however, that there is a sort of division—with regard to portraiture at least—between the "stars" and the lesser fry. It is hardly wise to cater for both, the one will kill the other. As to which rank is decided on will depend on the photographer, but naturally the "stars" are the most paying.

The usual requirements of stage artists might be summed up in four words: "striking portraits, large quantities." Their individual needs are, of course, only found out as one gets to know them. The sizes they like are from postcard upwards, and though there is no set style, they are always capable of explaining and describing exactly what they want, so there is little difficulty on that score. It may be as well to note, however, that the retouching should never be spared: marble-like features are more pleasing than true likeness. In the case of comedians with excessive "make-up" on, it is, of course, necessary to avoid altering the effect by application of retouching lead in the wrong places. "Stage" retouching can best be understood by examining closely the work of some of the well-known specialists in theatre work.

There is a great deal of copying done for professionals; nearly every actor and actress seems to have some favourite picture which they are often willing to have copied, perhaps for a few dozen or maybe a few hundred prints in some totally different style. This work often entails blocking out, vignetting, and other dodging, and skill in this line can be made to pay if it is only advertised judiciously.

Other theatrical work is that done in the theatre itself; the photographing of scenes or casts is sometimes possible by means of the available lights, but more often it means flashlight. Some proprietors, by the way, will not allow flash work in their theatres, but when this embargo is not down there should be little difficulty in any job undertaken in a theatre The subjects give little trouble—though their costumes nearly always need a colour-sensitive plate, a fast anti-screen is good—there is usually a choice of positions for the operator, and it only remains necessary to use a large enough flash and to watch for small electric globes where they are not required and to have them put out before opening the slide.

This work, and, in fact, nearly all direct work for stage artists, means "by appointment," and when a definite hour is fixed it is best to be very punctual. The "pro." on his or her part is seldom late, being used to fixed programme, and to be kept waiting, particularly if due for rehearsal or other business soon after, is not encouraging. At the same time, an appointment, unless otherwise arranged, may not be prompt in drawing to a close. If much "changing" is entailed time will fly *and so will plates*; therefore, unless the customer is known it is wise to have a definite statement of requirements at first and to limit exposures, or else have a system of proportionate deposit in advance. This latter is rather a delicate business with some, there being performers who like to pick and choose, and settle up later—probably from a distance—many of them, however, are "good" for a cheque of any size.—THERMIT.

Analecta.

Extracts from our weekly and monthly contemporaries.

Focussing Enlargements.

ONE of the troubles that assail the maker of big enlargements (writes "Onlooker" in "The Amateur Photographer and Photography" for October 2) is the difficulty that sometimes arises in correct focussing when the easel is a considerable distance from the lens or lantern front. The worker has to peer at the image on the screen, and at the same time endeavour to turn the focussing screw on the lantern, which is generally just beyond reach of his outstretched hand. There are three alternatives by which the difficulty can be overcome. Either he can focus a little at a time, and after each turn of the focussing screw go forward and observe the result on the screen (a most unsatisfactory method, but one that is probably more practised than any other); or he can use some form of magnifying glass that enables him to see the image at a distance—a plan that is more feasible than appears at first, and is akin to the opera glasses that are sometimes used by lantern operators in big halls to assist in getting fine focus on the lantern screen. The best method of all, however, is to use some form of simple mechanism that can be fitted to the enlarger to enable the worker to focus in comfort while standing by the easel. At least one well-known manufacturer has already adopted this idea in the form of a chain and sprocket arrangement, which acts admirably; and in the case of very big enlargements the worker stands at a distance of two or three yards from the enlarger, and yet gets his fine focus with ease. Another method embodying the same idea, which I saw recently on an enlarger, and which had distinct points of merit, was the fitting of a long screw through the front of the base of the lantern in the centre. This worked in a bush, and was connected with a thin iron rod about four feet long, the further end of which passed through the centre of the base of the easel and terminated in a small handle. The middle of the easel was fitted with a small pane of ground-glass, and the image was focussed through the glass and not on the surface of the easel in the usual way. Focussing was effected by turning the handle which projected behind the easel, and pulled forward or pushed back the front of the enlarger by means of the screw. Very fine focussing with the greatest ease was possible with this arrangement.

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DEFENCE OF THE REALM.—At Chichester last week William Joseph Sturley, a wireless operator in the mercantile service, was summoned for having a photographic apparatus in his possession at Bognor on September 9. He was seen by Special Constable Fry taking a photograph of his two sisters on the sands. The defence was that the young man did not know that a permit was required, as he had been away at sea for a long time, and that was his first holiday. He was on sick leave. Fined 10s.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, OCTOBER 14.

Bradford Photographic Society. "Scenes and Incidents on the Yorkshire Coast." W. Holmes.

TUESDAY, OCTOBER 15.

Manchester Amateur Photographic Society. Exhibition of Prints: Still Life Subjects.

WEDNESDAY, OCTOBER 16.

Croydon Camera Club. "Elementary Intensification and Reduction." H. C. Inskeep.

North Middlesex Photographic Society. Practical Lantern Slide Making.

THURSDAY, OCTOBER 17.

Brighouse Photographic Society. "Wanderings in the West Riding of Yorkshire." W. Holmes.

CROYDON CAMERA CLUB.

WITH the cheering news from all fronts, the opening of the regular season found everybody in the best of spirits. The president, Mr. A. F. Catharine, by virtue of immemorial custom, delivered the usual presidential address, which was mercifully short, in no wise fluffy, and about nothing in particular, the absence of subject being handled in masterly and humorous fashion. Never lulling by feeble oratory, he is invariably listened to, and the discourse in question deserved a careful hearing if only for the reason that much anguish of soul, and probably language of sorts not incorporated, must have accompanied its preparation, for Mr. Catharine has but little spare time at his disposal, being engrossed in hydraulic machinery, condenser plants, and so forth. In the club rooms he deals only and sparingly with water whose specific gravity has been lightened by certain methods, yet in its special application has far more potential energy than the pure fluid, the maximum being sought for by placing the lecturer of the evening on the free list. Unfortunately, not always has this the desired effect, for with some temperaments a latent tendency to the didactic is manifested, and in one well remembered case a visitor concluded his lecture at the rate of about four words a minute, nearly missing his last train home in consequence. On the other hand, it must be confessed that many a time has dry ginger ale more than held its own in debate.

As we have remarked, Mr. Catharine's paper was about nothing in particular, and having emphasised that point he at once made a graceful allusion to the hard-working secretary, Mr. J. M. Sellors, to whom so much is due. The lecturer said that on several past occasions he had intended to write a lengthy address on some original subject the week after each resolve, but as the relationship between the resolve and time of performance remained a constant factor, ultimately he found himself at a loose end. In spite of adverse conditions, the club was very much alive. Not a few new members had joined during the year, and they rapidly became acclimatised to the atmosphere, and appreciated the "naturalness" to which in large measure their vitality was due. Members were no more polite to each other than brothers were polite to each other, and fraternally expressed similar candid opinions. Mr. Tilney had pointed out that "naturalness" was the life of a picture, so also was it the life of a club.

Although the cause was hard to trace, notable was the decrease of that distressing complaint "powder-mania." It might be due to the absence of advanced [illegible], thus lessening the danger of infection, or to [illegible] from the terrible [illegible] most virulent form. He was, however, of the opinion that the germ was only scotched and not killed, and the disease would eventually break out again. He, indeed, doubted whether a real cure would ever be discovered, and his brief paper, therefore, had to end with a note of gloom.

The address was followed by an elementary exposition on stereoscopy (by desire), Mr. Catharine being an ardent "two-eyed camera" man. Several stereo-prints were shown incorrectly mounted, and some correctly. With the former some resolved the two pictures into one with ease, but [illegible] failed with the latter. Which was all wrong, of course. One of the experts, who had never taken a stereogram in their lives, also gave some valuable advice. Mr. Walker, another stereogramist (if that be the correct term), on being asked to contribute, rose, and after some hesitation said he could think of nothing to say. "Then sit down again," said the office boy, and Mr. Walker sat. A pleasing illustration of that "naturalness" which makes either a picture or a club.

Recently Messrs. Reynolds and Rose have complained bitterly of draughts in the club room, so the council appointed them honorary jobbing workmen to stop the alleged nuisance. Every known orifice, down to the keyholes, these enterprising draught excluders have covered with brown paper. By this method they have so localised the ingress of air as to secure miniature cyclones, and Mr. Reynolds very wisely wore his overcoat throughout the evening. Others, who had never noticed a draught before, gave them their blessing. It revived recollections of Dr. Mees and his powerful electric fan, which once nearly projected an unsuspecting chairman through the window, possibly a happier fate than the cold meat storage he subsequently endured.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—Mr. N. E. Luboshez, in a recent lecture on "Portraiture (Front Lighting)," said that photography had made such rapid strides during the past few years that it was really difficult at times to say which of its many and varied branches is really the most interesting. Personally, whichever branch he took up, whether it were portraiture, technical or scientific, he found all of great interest. Recently he had been engaged upon the very interesting task of photographing cartridges to discover flaws which were invisible to the microscope.

Turning to his subject, he said that a portrait should not only be an artistic and pleasing production, it should be a likeness of some striking characteristic of the model, a picture in which that characteristic was predominant. This likeness of character was best reproduced by the aid of front lighting. One had only to study the old masters of portraiture and the productions of the pioneers of photographic portraiture to realise that they, as artists, appreciated the value of light; they knew the value of getting plenty of light into the shadows. Front lighting meant an enormous advantage where exposure was concerned; in fact, exposure was cut down considerably without any loss of detail, quality or modelling. The average professional photographer who uses side lighting had to expose for the shadows, and more often than not the ear nearer the light was obviously over-exposed, and had to be worked upon on either the print or the negative. With front lighting there was little or no need for retouching, other than the levelling up of small spots where they had been present in the sitter's face.

Front lighting did not necessarily mean a loss of modelling, but the lighting, exposure, development and printing required to be in harmony. A slight turn of the head would more often than not produce a really remarkable effect, but it must only be a very slight turn. It was extremely important to bear in mind that sufficient light at a given distance and angle would enable the photographer to secure remarkably fine reproductions of character and at the same time avoid flatness. With the source of light in the same line as the camera and sitter, very fine effects could be produced, especially when the source of light is above the level of the sitter's head. It was also possible in some instances to move the camera slightly to the right or left and secure an entirely different effect.

Before attempting to photograph any model, it was essential that the photographer should have determined what is the strong characteristic of that person: it might be an exceptionally fine forehead—well, let that be the point nearest the source of light, and so obtain emphasis. A single sitter would, of course, not require so large a source of light as a group. In the first instance, it was advisable to have a small source of light; in the latter, a broader source. In other words, the source of light must be altered to suit the subject.

If the lighting was broad and strong, it was necessary to exercise extreme care in exposure and development, so as not to lose the half-tones, especially on the white collar of a male sitter; modelling under such conditions would, of course, be very delicate. Distance from the source of light was also of very great importance. For instance, a group of three electric lights would act as one beyond a certain distance. If wrinkles were required on the face or forehead, these could easily be obtained by using a higher source of light or slightly lowering the head, and thus lengthening the shadows.

To eliminate wrinkles it was necessary to allow the light to penetrate into the shadows by lowering the source of light, or moving the sitter farther away. If only one source of light was used, and that a fairly small one, the eyes became remarkably expressive and lifelike, and some really striking results could be obtained if the model looked straight into the lens.

Photographers ought not to forget that the eye is moist, and will reflect all sources of light; therefore, if a really truthful rendering is desired, one source of light would be found to give the best effect. The light must, of course, fall from the correct angle, and the pupil must remain black. If this was looked to, it would be found that there would be a sense of skin and texture in the eyes, which would be reproduced in the negative.

If a sidelight was used it would be found that the pupil of the eye on the lighter side of the face would be considerably smaller than the pupil on the shadow side. Both should, of course, be the same size, and this was only possible when both were the same distance from the source of light. A diffused lighting could be obtained by moving the model farther away, which would, of course, result in a lower tone-rendering.

Rembrandt style of portraiture was not a heavy shadow on one side and all light on the other. As a matter of fact, Rembrandt was all light, and the shadows of the great artist's work had more light in them than any photographer could produce in his high lights. The artist always saw light in the shadows, and showed plenty of detail, but only in a slightly lower tone than the high-lights. Shadow detail could, of course, be obtained by exposing for the shadows, and the high-lights did not need to be sacrificed if the developer was made to bring out the shadow detail first. This could be accomplished by the use of very dilute developer.

Printing was, of course, very important, and needed to be kept in harmony with all the other operations. Chiffon could be used with advantage when enlarging from hard negatives, but for soft negatives it was of very little use, as it seemed to throw a veil of fog over the whole picture.

In concluding, Mr. Luboshez said he was exceedingly pleased to see such excellent results as shown by the prints brought along by the members. They had successfully applied the methods he had advocated; this application, *plus* individuality, had resulted in a really interesting set of portraits. He noticed that he was to judge the prints in question. "He had never been a judge, although he had often been judged."

Three new members were elected, and Mr. Mauger was presented with a bronze plaque for the best set of prints in the 1917-18 portfolio.

News and Notes.

New Sources of Photographic Supplies Required.—An application has been received by the Board of Trade Commercial Intelligence Department for the names of manufacturers or producers of photographic films, coating, cutting, and reeling machines. British manufacturers or producers of these articles now in a position to supply are invited to make application for the name of the inquirer to the Department of Overseas Trade (Development and Intelligence), 73, Basinghall Street, E.C.2.

The Photo-Micrographic Society.—The first ordinary meeting of the Photo-Micrographic Society will be held on Wednesday, October 23, at 7 p.m., at King's College Bacteriological Laboratories, 62, Chandos Street, W.C., when the president, Dr. G. H. Rodman, F.R.P.S., will give a lecture entitled "The Flea: its life history, minute structure, and influence in the dissemination of plague." Visitors will be welcomed, and cards of invitation may be obtained from the hon. secretary, Mr. J. G. Bradbury, 1, Hogarth Hill, Finchley Road, Hendon, N.W.4.

Sheffield and District Professional Photographers' Association.—At a representative meeting of professional photographers, held at Stephenson's Café, Sheffield, on Tuesday, October 1, the Sheffield and District Professional Photographers' Association was formed, rules formulated, and officers appointed as follows:—President, Mr. Dickinson; Vice President, Mr. Yates; Hon. Treasurer, Mr. Furniss; Hon Secretary, Mr. Markcrow. Annual subscription to be one guinea; managers to be admitted to membership; meetings to be held on the first Wednesday of each month at 7 p.m. Professional photographers (proprietors or managers) within a twenty mile radius of Sheffield will be admitted to membership, and are invited to join the association. It was decided unanimously at the meeting to protest against the present high prices of photographic plates. Most of those present are already members of the P.P.A., and the Sheffield Association recommend other of their members to join the National Association.

Man-Woman Photographer's Assistant.—The remarkable deception successfully practised by a woman who has masqueraded as a man for thirty years has been revealed by a sudden attack of illness. "Ferdinand" Hansen had a paralytic seizure in Briggate, Leeds, and was taken to "his" lodgings by two young ladies. A medical man who was called in ordered the patient's removal to the workhouse infirmary, where it was ascertained that the supposed man was a woman. Hansen is seventy-three years of age, and appears to have been posing as a man during the whole of her long residence in this country. She has worked in different towns as a photographer's assistant. Mrs. Green, of Lilac Grove, Skinner Lane, Leeds, with whom Hansen has lodged for seven years, said her lodger was a heavy pipe smoker, and kept her hair short. "He always behaved like a gentleman," she said, adding: "He was well educated and spoke several languages."

Demand for Apparatus.—During the past week or two London photographic dealers have found a very brisk demand for cameras and lenses of about half-plate size; in fact, at the moment very few are left on hand. Although not purchased through official channels, it is believed that most of them have been acquired by our own and the United States Governments. Photographers who have any unwanted apparatus have now the best opportunity that is likely to occur for some time to turn the same into cash. Lately a large quantity of good apparatus has been sold at auction and has fetched unusually good prices, in many cases beyond that in the second-hand dealers' lists. Anyone compelled to purchase should not delay, as prices may go yet higher, although they are now high enough to tempt sellers. It should be clearly borne in mind that obsolete cameras and lenses are not required. Studio cameras and stands, portrait lenses of good make, and good—preferably parallel-bellows—field cameras seem to be most in demand.

Key Industries Exhibition.—An exhibition which has been organised by the Industrial Section of the Tariff Reform League is now being held at the Central Hall, Westminster, London, S.W.1, where it is open free to the public. The exhibition is concerned largely with dyes, with metals of special industrial importance, such as tungsten, manganese, etc., and with articles or products such as magnetos, optical glass, rubber, and metal pressed goods. Although by no means exhaustive in its inclusion of the industries which have been called into existence in this country during the period of the war, the exhibition is an eloquent demonstration of what has been accomplished in many fields of industrial enterprise. Appreciation of this progress is rendered easy by the explanatory chapters contained in the catalogue. Exhibits which are of particular interest to photographers are those of Messrs. Johnson and Sons (of photographic chemicals), of Messrs. Thomas Illingworth and Co. (of photographic prints and negatives on the firm's new X-ray paper), and of Messrs. Chance Bros., who show specimens of new optical glasses. The White Band Manufacturing Co. also exhibit their photographic developers, and picture-frame mouldings are shown by Messrs. R. Scully and Messrs. Bennett and Jennison.

Registration of Business Names Act.—The Home Office announces that under the provisions of the above Act those individuals or firms who, before February 22, 1917, changed the business name to the true surname or surnames of the individual or partners, with no addition other than the true Christian names (or initials), were not required to register under Section 1. By Regulation 14H under the Defence of the Realm Act, however, where any person, not being a natural born British subject, carries on, or purports or continues to carry on, or is member of a partnership or firm which carries on or which purports or continues to carry on, *any trade or business in any name other than that under which the trade or business was carried on at the date of the commencement of the war*, he or the firm shall not assume or purport to assume or use or continue after the 19th day of August, 1918, the assumption or use of any business name other than that by which he or the firm was ordinarily known at the date of the commencement of the war, unless an exemption under the Regulation has been obtained from the Secretary of State for the Home Department in respect of the changed name. Any individual or firm required under this Regulation to revert to the business name under which business was carried on before the commencement of the war must comply with the provisions of the Registration of Business Names Act, 1916.

A YORKSHIRE PHOTOGRAPHIC TROPHY.—Mr. Alex Keighley, of Steeton, whose individual work and influence have done so much to raise photography as a medium of art, has placed the camera enthusiasts of Yorkshire under a further obligation by his gift to the Yorkshire Photographic Union of a handsome challenge trophy, the express purpose of which is to stimulate the production of pictorial work. The trophy is of singular beauty, and from any donor would have been gladly received. But coming from Mr. Keighley, so distinguished a master in the art it seeks to inspire and encourage, the intrinsic and artistic worth of the trophy will always, among photographers, be strongly reinforced by a sentimental value. A trophy so appropriate may surely be expected to fire the ambition of every society in the union and raise perceptibly the standard of work done. Mr. Keighley, in making the presentation at a recent meeting of the Union, paid a high tribute to the educational facilities afforded by the Bradford Free Library. His own education had a distinctly scientific bias, and it seems to have been his interest in science rather than a bent for art that caused him in the first place to purchase a photographic outfit. Later, when he discovered and resolved to develop the latent possibilities of photography as a medium for producing pictorial results, he found it necessary to obtain some knowledge of art. His college of art was the Bradford Free Library, where he was long a regular visitor. "I should think," Mr. Keighley said, "it would be difficult to find anywhere a more complete library of books on art than is to be found in that institution."

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Correspondence.

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** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

** *We do not undertake responsibility for the opinions expressed by our correspondents.*

GLAZING PRINTS ON BOTH SIDES.

To the Editors.

Gentlemen,—Some time ago I was asked for some prints, glossy on both sides, and being a small order I managed to supply. I did it by making the prints on glossy paper in the usual way. Some [illegible] unused glossy paper was then fixed and washed in the usual way without, of course, printing upon it. The glossy prints and the glossy paper (unprinted) were then stuck together, i.e., unglazed sides in contact, and, when quite dry, the prints were trimmed up with a Merritt trimmer. No join could be detected, and the prints gave satisfaction. Should I get a large order of this particular kind I should write to some of the sensitive paper makers for some faulty and rejected batches, and work in the same way, using the faulty paper for backing prints.—Yours faithfully,

L. T. W.

To the Editors.

Gentlemen,—Replying to Mr. Dicken *re* glazing both sides, we would recommend him to the following:—

Assuming he has glazed his prints on the photograph side, without any further treatment he should brush the backs over with a stiff brush charged with ordinary painter's varnish. We have heard of the work being "sized" first, but prefer the method without. If possible, a good thinning down with methylated spirit is well worth while as the work can be done in half the time, and the polish is twice as brilliant.

We have done thousands of postcards of the same subjects as Mr. Dickens, and since the order we have used this varnish—which, to say the least of it—has passed Government requirements.

We are enclosing you a sample card, the only one we have lying about, and far from a good specimen, and if Mr. Dicken would like any further information on the matter, we shall be most pleased to give him any assistance we can.

Possibly someone may come along with a better method, and we shall watch your columns with interest.

However, where speed is a consideration, we think the varnish method is well worth a trial, but we omitted to say that the prints must be hung up until quite dry, which should take about ten hours.

Trusting we have been of some little service, we are, gentlemen, with compliments, faithfully yours,

ARTHUR J. C. LEWIS.

New Barnet, Herts.

GERMAN MADE FORMULÆ.

To the Editors.

Gentlemen,—I read with particular interest your reply to "G. C.," which appears on page 452 of last week's "B.J." I gather from the paragraph that your correspondent has some idea of making up the Agfa intensifier, a commercial preparation which in pre-war days enjoyed some popularity. The intensifier was, I believe, popular because of its being in a handy one-solution form and clean working, and another reason I venture to put forward, and on my own responsibility, was that the advertisements of it led us to believe—though I must admit that the fact was not stated in cold print—that the solution contained no bichloride of mercury, a salt we all know to be dangerous to the life of a negative. The actual wording of the pre-war advertisement now before me reads: "Agfa intensifier is intended to replace the ordinary mode of intensification with mercury or uranium . . . (it) is, therefore, an ideal substitute for former intensifiers." As we know now, the intensifier consists of bichloride of mercury and potassium sulphocyanide and apparently nothing else, except, of course, water.

You do a wise thing in ending your reply to "G. C." with the words, "We should imagine that some considerable experience is required to compound the intensifier in its best working condition." Those of us who used the Agfa and other German-made proprietary solutions, and since their disappearance from the British market have tried to make them according to the published and more or less secret formulæ obtained from German and other sources, have discovered that such solutions are rarely, if ever, what they appear to be, and there is a suspicion that the published formulæ are inaccurate, or I might say with even greater truthfulness, incomplete. What there is of them in published formulæ may be correct enough, but with most of them, if not all, there is undoubtedly something missing. One finds this out in making Rodinal according to the formulæ as published, and your correspondent, I fear, will come to grief if he attempts to make up the intensifier. Some amateur chemists may put down their failures to incorrect mixing, and at times this may be a legitimate cause of failure, but experiments carried out in America in the way of making things according to German patent specifications prove without a doubt that many specifications of German origin are "camouflaged."

I am not an expert in British and American laws concerning patents, but I learn from the United States Press that chemical and other experts have been, and even now are employed by the Washington authorities, to investigate German patents, and that many of the specifications have been found to be incorrect and worded purposely to mislead. Happily, the "one thing wanted" to make the specifications agree with the marketed product has in most cases been found by experimenting, and America will profit accordingly, with the result that after the war, when the German starts commerce again, as he hopes to do, some pretty little problems in patent law will, in all probability, be met with.—Yours faithfully,

GODFREY WILSON.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

A. J.—Mr. Alexander Mackie is the Secretary of the Professional Photographers' Association, 89, Albany Street, London, N.W.1.

T. A.—If you are removing from the old premises, and not carrying on the new business as a branch one, and if nothing is being added as a new line which was not included up to February 18, then you do not come within the provisions of the Retail Business Order, and a licence is not necessary.

L. R. We have no opportunity of referring to a Voigtlander reflex, but it would appear to us that the correct position for the pivots on the pinions would be as No. 1, and as marked on No 2 with crosses. So arranged, the driving gear could never get on a dead centre, as would be possible in either of the two positions you give.

N. N.—You can secure enlargements of exellent quality from an enlarger working with reflected light, but the exposures will be much longer. For enlarging from small negatives up to 8½ x 6½ a condenser is preferable, unless you have an arc or half-watt lamp at your disposal. With a very powerful light, a white reflector answers as well as daylight.

H. A.—1. We are sorry that we cannot identify the Dallmeyer lens from your description. 2. For the iodine-cyanide reducer take a small quantity of iodine and an equal weight of iodide of potassium, say ½ oz. of each in 10 ounces of water. Take 1 drachm of this solution to 4 ozs. of water and add about a drachm of 10 per cent. cyanide solution which will render it colourless. If this works too quickly, dilute with water.

A. E. T.—The only explanation we can give of your plate refusing to blacken in the developer is that you have not sufficiently exposed the film to daylight during development. With amidol this is hardly necessary, but with other developers a fair exposure is needed. On the other hand, excessive exposure to light tends to give imperfect blackening. If the negative refuses to blacken after twenty minutes' development, you might bleach again, wash well, and re-develop.

S. F.—We know of no reason why you should not use the expression "late R.A.F." in connection with your proposed business. You are, of course, aware that under the "New Retail Business Order" it will be necessary for you to make formal application for permission to open any new business; this application must be made to the Director of National Service of the region in which you wish to open. A list of these regional addresses appeared in our issue of September 20

G. M.—The blisters are probably due to your using a strong fixing bath and transferring the plates directly to the washing water. Either use a weaker fixer and fix longer or transfer to an intermediate fixing bath of half the strength. If this is not the cause, blisters may be due to a considerable difference in temperature between the hypo and the washing water, in which case have the first washing water at a temperature intermediate between the hypo and the tap water.

H. C.—You cannot do better than use the chrome alum and hypo bath, which is made up as follows:—

Add	
Strong sulphuric acid	2 dr. (fl.)
Water	2 ozs.
to	
Sodium sulphite	2 ozs.
Water	6 ozs.
and pour the mixture into—	
Hypo	16 ozs.
Water	48 ozs.
Finally, add to the above mixture—	
Chrome alum	1 oz.
Water	8 ozs.

It is necessary to be very careful to mix the ingredients in the order given.

F. W. M.—You will always get a certain amount of doubling of outline in using chiffon, as we suppose you are using it, on the lens hood. Perhaps you could reduce it somewhat by mounting the chiffon in a larger frame, which you could keep in movement during exposure. Another dodge which has been used for diffusion effects consists in having a source of heat, such as a small ring gas-burner, somewhat below the lens, the waves of heated air giving rise to a certain amount of diffusion. This was used in the old days, though not to any great extent. You do not refer us to the paragraph in the "B.J." dealing with bichromate as a regenerator of the sulphide bleaching bath, and we have not a distinct recollection of it. Personally we think that no useful object is served in tinkering about with a sulphide-ferricyanide bath. Perhaps the stains in the use of the iodine cyanide reducer of Mr. Greenall are due to blue iodide of starch being formed from the iodine and the starch in the paper. If this is so, the mixture probably wants the addition of more cyanide, or the stains can be removed afterwards by some metabisulphite. A saturated solution is one which contains as much of the chemical in question as it will dissolve at a given temperature. It is made either by shaking up the cold water with a considerable excess of the chemical, or, in some cases, dissolving the chemical in hot water and allowing the solution to cool, when, if the solution is to be saturated, a proportion of the chemical should crystallise out in the solid state.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

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Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
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SUMMARY.

In an article on page 466 we deal with the question of enlarging from rather larger size negatives than those usually handled, and enumerate various methods of working with appliances readily obtainable.

In our notice of the sixty-third annual exhibition of the Royal Photographic Society, now open, we present on page 467 a review of the portrait exhibits, and on page 468 will be found a personal general impression of the whole of the show by Mr. F. C. Tilney.

The surface of the negative is seldom as clear as it might be when it leaves the fixing bath. The desirability of removing surface dirt is indicated on page 466.

The price of plates has led many to economise by making small negatives for subsequent enlargement. The desirability of so placing the subject upon that plate so that enlarging can be done without calling for judgment on the part of the operator is the subject of a note on page 471.

An abstract of the twenty-first Traill Taylor Memorial Lecture, delivered by Mr. F. Twyman before the Royal Photographic Society, on the subject of lens testing by means of interferometers, will be found on page 472.

A simple method of applying an even coating of non-actinic colour to the back of the negative when it is necessary to retard printing locally, or otherwise, is detailed on page 465.

In his presidential address before the Edinburgh Society of Professional Photographers Mr. E. Drummond Young referred to the great need of a specific art training for assistants as a means of raising the standard of professional portraiture. He also suggested a greater unity with regard to advertising, prices, and exhibition of work among the profession. (P. 469.)

A lengthy specification of the details of an apron for drying coated film in continuous lengths is given, with diagrams, on page 471.

Carbon printers find that the approach of winter brings sundry troubles in its train; some suggestions which may be helpful will be found on page 465.

Various useful hints on mounting prints will be found in the report of the South London Photographic Society. (P. 474.)

Letters from correspondents deal with glazing prints on both sides, the Co-operative Plate Works, and postage rates for pictorial cards. (P. 475.)

A depot has been opened in London for the sale of war photographs in various sizes and styles. Prices and other information will be found on page 473.

EX CATHEDRA.

Paint on the Back of Negatives. In our issue of July 5 last we referred to the use of "Student's" gamboge water-colour paint on the glass side of negatives, and described a method of obtaining a level tint by means of fitch-hair dabbers. With tubes recently purchased, the paint has remained persistently and undesirably tacky, doubtless due to some alteration in manufacture owing to existing conditions. In hunting about for a substitute one was found in all respects superior. It permits of comparatively large areas being covered evenly and without granularity, of distinct value when clear-glass shadows have to be kept back; it may be more perfectly graduated from a medium to a very light tint; it has good light-stopping power, and hides the outlineless; and finally it sets firmly. The substitute is yellow dye mixed with gum. The particular dye used was Harrington's "special aniline yellow" water-soluble, obtainable through a chemist only. A convenient working strength is 60 grains dissolved in 1 ounce of hot water, to which 2 fluid ounces of thick gum (about the consistency of golden syrup) is added. It need hardly be pointed out that "office gum" thickened by evaporating it in a dish will meet the case. For dilution, gum of ordinary consistency is employed. It is essential that the glass be clean and free from grease, and the dabbing must be continued until the mixture is set, otherwise an even tint may not be obtained. Isolated small parts, such as a heavy shadow under the chin, can be evenly coated with a sable brush. For further details the article already quoted must be consulted.

* * *

Carbon in Winter. The experienced carbon printer has a pretty good idea as to the atmospherical conditions necessary to the production of good work; but the beginner who has started in the spring or summer usually gets into trouble about this time of year, when cold, damp and dull days are to be expected. It is a good plan to assume that conditions which make for personal comfort are also those which are favourable to carbon printing; an equable, fairly warm, temperature and a rather dry atmosphere will remove most of the seasonable troubles of the process. Cold and damp mean rapid deterioration of the tissue if it is left exposed to the atmosphere for even a short time while continuating action goes on so rapidly that it is often not suspected, and correct exposure becomes difficult. Recently we found a batch of prints much under-exposed, and put them aside to "pick up" a little. It was a damp day and the walls were almost bedewed. In two hours the prints proved to be fully exposed and developed well. Now if the first prints had proved right, and the development of the remainder had been delayed, the later ones would have been spoiled, and the exposure blamed by the fair-weather operator. Another difficulty often arises in damp weather in stripping from the temporary support. If the transfer paper remains on too long, before it is quite dry it often refuses to strip, and print and flexible support are both wasted. The best way to secure good prints with the minimum of worry is to work in a warm room free from gas or coke fumes, if possible printing in the same room by a mercury-vapour lamp and using an electric fan to accelerate drying when transferring. The artificial light ensures printing being done in time to develop the same day, for if prints have to be left on the negatives all night in winter weather they are seldom worth developing next day. All sensitive tissue and exposed prints should be kept in a calcium box with even more care than is needed for platinum papers. Finally, it is necessary to give ample time for the wax supports to harden, as the turpentine evaporates more slowly at low temperature.

* * *

Surface Deposits. With many of the developers and fixing baths now used there is great danger of leaving a deposit of what may broadly be called dirt upon the surface of the negative film, and even upon bromide papers. This, being in the nature of a very thin veil, would usually pass unnoticed if the negatives were simply dried and printed, but when a retouching medium is applied it renders this filmy deposit more transparent, so that a patchy appearance is given to the print. Moreover, if such negatives have to be intensified or reduced, stains may arise from the dirt reacting upon the bleaching agent. There is a growing tendency to use the new developers for negative work, and as they are used repeatedly they become turbid, giving the result mentioned, while some of the acid fixing baths leave a fine deposit of sulphur upon the plate. The remedy for all this is thoroughly to swab the gelatine surface with a fair-sized pad of cotton wool, or, what is better and more economical, a piece of soft wash leather. Except in very hot weather there is little risk of scratching the surface, and the risk is obviated by the use of an efficient hardening solution in the fixing bath, or in extreme cases by the use of a separate formaline bath. If the gelatine surface is allowed to dry before it is cleaned it will be found difficult to treat it by re-wetting, and it is better to use methylated spirit, turpentine, or petrol applied with a pad of cotton wool or flannelette.

* * *

An Orderly Dark Room. When a photographer is working single-handed, he may, of course, please himself as to the condition of his dark-room. He knows, or thinks he knows, what all the unlabelled bottles contain, which dishes are saturated with hypo or mercury, and where to find the racks or tanks for an unusual size; but when assistants are employed, such a lack of method is not only wasteful, but may lead to actual disaster. The great point is to keep as few things in the dark-room as is possible, and to provide definite places for each. Next in importance comes legible labelling of all bottles, whether stock chemicals or mixed solutions. Wherever it is possible, stock chemicals should not be kept in the dark-room, nor should solutions be made therein. It is a good plan to have all formulæ actually in use written out clearly and posted up where they can be seen readily, so that it would be quite possible for a stranger to go into the dark-room and start work without further instructions. It is wonderful what facilities in working can be obtained by a little judicious planning, and what a number of stains, scratches, and broken negatives are avoided. The holiday season, when there is a temporary rearrangement of labour, is a time when any lack of system of this sort is most keenly felt. We have just been talking to a photographer who found himself a stranger in his own dark-room during an assistant's holiday, while the assistant on his return complained that he found everything upset. It is not too soon to think of Christmas work now, and to get ready for it by making the way smooth in little matters like this.

ENLARGING METHODS.

To most people the mention of enlarging apparatus only suggests the magnified magic lantern which is so generally used, and for small negatives, say, up to half-plate or even to whole-plate size, this type is convenient and leaves little to be desired. When the diameter of the condenser exceeds ten inches practical difficulties have to be encountered, and these are not so much inherent in the design as in the optical imperfections which cannot be eliminated without an outlay which would be prohibitive to any but the most wealthy purchasers. In order to obtain a sufficiently good light with a large apparatus, the electric arc is usually employed, and this, although theoretically perfect, has a way of finding out imperfections in the grinding of the condenser as well as in the annealing and uniformity of density in the glass itself. Hence dark patches with colour fringes, which alter in position upon the screen when the light is moved, but which cannot be got rid of altogether. With a large illuminant, such as an incandescent mantle, these defects are less evident, because the source of light is larger, and rays from more widely separated points falling upon the condenser simultaneously tend to equalise the illumination over the whole field of the lens. In a similar way the introduction of one or more pieces of ground glass tends to the same end, but at the expense of illuminating power—a serious matter if a dense negative has to be dealt with, unless the size of the arc which is being used is out of all proportion to the work which is usually required of it. From some recent experiments we are led to believe that a solution of the difficulty will be found in the use of one of the smaller nitrogen-filled lamps of the type generally known as "half-watt." In the pattern which is most suitable for our purpose the filament is made in the form of a fine spiral like a bell spring, which is bent into a circular form so that it gives an apparently solid ring of light, which is horizontal when the lamp is in a pendant position. In order to make the best use of these lamps, this ring of light must be parallel with the surface of the condenser. There is thus a temptation to fix it "end on," but this does not conduce to the longevity of the lamp, for not only is the filament more likely to fracture, but the blackening of the bulb, which should be confined to the specially designed neck, is spread over the whole surface. It is, therefore, a better plan to have the lamp in its normal position, and to transmit the rays to the condenser by means of an ordinary mirror, silvered on the back, the direct light from the side of the spiral being cut off by a metal or asbestos shield. Those familiar with the Howellite gas lamp for projection will readily see the necessity for this.

So far we have assumed that expense is no object and that shortness of exposure is of great consequence, in order that slow papers of the Kodura or Cyko types can be used for enlarging as well as the more rapid bromide papers. If this be not the case, excellent results may be obtained without the use of a condenser at all, a powerful light being placed behind the negative and diffused by means of two or even more thicknesses of ground glass. In this connection it may be noted that most of those who have used this method have failed to avail themselves of the great aid of an efficient reflector. If an ordinary silvered concave glass reflector, such as is commonly used behind gas lights in passages and corridors, be properly adjusted, a brightly illuminated disc will be projected upon the ground glass diffuser. The illumination will be more even and the exposures reduced by at least one-half. Even four pieces of silvered glass fixed in the form of a hollow pyramid, with the light in the centre, will give greatly increased evenness and strength of lighting.

Of direct lighting systems of this class the specially designed "gridiron" pattern of mercury vapour lamp is probably the nearest to perfection we are likely to obtain. Here we have a set of short parallel tubes emitting an intensely actinic light, which are placed comparatively near the negative with a ground glass diffuser between. This arrangement is extensively used in America, but does not seem to be so widely known in this country as its merits warrant. Enlarging by daylight is little practised in this country, possibly because the work can only be proceeded with at certain times, and these times are usually otherwise occupied. If there is a possibility of putting a small skylight in the dark-room roof and fixing a nearly vertical enlarger beneath it, there can be nothing simpler or cheaper. In former years a great firm made thousands—perhaps millions—of collodion transfer enlargements in this way with perfect success and ease of working; but in these days it would not do to have to wait for good daylight to make an enlargement for Press purposes. Nevertheless, such an apparatus forms a very useful addendum to the ordinary enlarging lantern, when an order comes in for a large print from a 12 by 10 negative.

Illumination of the negative by reflected light has been recommended by some, and various lighting attachments have been devised for the purpose. They are all very similar in design. A white screen is fixed behind the negative, and two or more powerful lights are placed, so that it is as evenly illuminated as possible. The results obtained are excellent, but, except for small sizes, the exposures are unduly prolonged, even the rapid papers requiring exposures of three to thirty minutes with two small arc lamps and a lens working at a normal *f*/8. With very thin negatives results can be obtained which cannot be equalled by any other method, but with dense ones it is impossible to get detail in the high-lights with any exposure in reason. A point which must not be overlooked is the distance between light, reflecting screen, and negative: this should be adjustable, so that for small negatives the illumination may be made stronger, while for larger ones, in which more surface has to be used, the light can be equally distributed over it.

THE EXHIBITION OF THE ROYAL PHOTOGRAPHIC SOCIETY.

The fifth—and it may be thought the last—exhibition of the Royal Photographic Society to be held during the war opened at the Society's house, 35, Russell Square, on Saturday last, when it received something in the nature of official approval from the military authorities. General Sykes, of the Royal Air Force, attended to declare it open, and short addresses were delivered by General Ashmore, head of the London anti-aircraft defences, and by Colonel Moore-Brabazon, head of the R.A.F. Photographic Section. General Sykes, in his address, dwelt upon the elaboration of a system of aerial photographic investigation which had been realised since the beginning of the war. Starting from the negligible beginning of one aeroplane camera the photographic air service had continued to keep pace with the conditions imposed by developments of warfare. He touched upon the technical photographic problems which had had to be solved in the systematic and continuous work of recording the enemy's plans by means of photographs taken from the air. Of some of these solutions it was desirable to say nothing, for the reason that apparently they were solutions which had not yet been reached by the enemy. He paid a tribute to the help which had been given in this military photography by the Society's president, Dr. C. Atkin Swan, whose collaboration, he said, had been of the utmost value in their work of making the aerial camera the eagle eye of the Army.

General Sykes was followed by General Ashmore, by Mr. Perkins Bull, K.C., and by Colonel Moore-Brabazon, the latter referring to the development of the manufacture of optical glass in this country, for which, he said, they had to thank an officer of the R.A.F., Captain Toye.

A pleasing incident of the opening proceedings was the presentation to Mr. W. B. Ferguson, K.C., of the first Hurter-Driffield Memorial Medal, awarded to Mr. Ferguson for the lecture recently delivered by him on the early work of Hurter and Driffield, and the first of the discourses to be delivered in commemoration of the work of these two investigators. Mr. Ferguson during the last two years has devoted an immense amount of time to the arrangement of the manuscripts of Hurter and Driffield, and visitors to the exhibition will have the opportunity of examining in the Society's Museum on the second floor the collection of the original apparatus used in the H. and D. photo-chemical investigations, and constructed for the most part by Mr. Driffield himself.

PORTRAITS IN THE PICTORIAL SECTION.

At the present exhibition there are not a great many portraits; but what there are rank, almost without exception, as fine things. Pre-eminently the excellent works of N. E. Luboshez will strike both the expert photographer and the artistic amateur as uncommonly noteworthy. The portraits of Dr. Kenneth Mees (15) and John Karztberg, Stockholm (19), certainly stand high not only in the work of the year, but in all the records of photographic portraiture. These two life-sized heads are simple, unaffected attempts to give *the man*. They dally with no trickery of lighting, no high falutin artistry; but they are downright representations of their subjects in normal conditions. Dr. Kenneth Mees we know well in the life, and from our knowledge can appraise at its full value the telling likeness. The Swedish gentleman is less well known, but his portrait will not be less admired on that account, for it is convincing in its personality. Whilst Dr. Mees sits quiet and self-absorbed, though perhaps a little conscious of the camera, the other sitter has a more spontaneous poise of the head, which is superbly managed as to lighting and, by its "roundness" and modelling, rises to a high level of pictorial merit. Both these prints are strong and forcible, of a pleasant tint, rich and full in the shadows and bright in the high-lights. An enlargement of a photograph of Tolstoy in peasant's garb shows the Count as possessing the facial characteristics of the Russian type, with the unsophisticated, almost humble look of the peasant, and nothing of the bearing of a Count. Perhaps the smock-like garment is too much in evidence for the prominence which the head should receive.

Hugo van Wadenoyen, jun., is another portraitist whose work is to the fore this year. He succeeds best with heads of young ladies, with whom he adopts a sort of formula for lighting. His favourite plan seems to be to put the face in a gentle half-light and to relieve it on one side by a high-light coming somewhat from behind. It is a very effective scheme, seen to advantage in "Portrait of a Girl" (14) and "Portrait" (18). "Reflex, a self-portrait" (107), carries out the same idea; but in "The Necklace" (102) he falls back on the now hackneyed notion of placing a sitter on a chair close to a wall where she is merged into her own shadow. Richard Hopkins shows us a "Portrait of Hugo van Wadenoyen, jun." (119), wherein the side-lighting is again the scheme. This is a fine work, though a little hard in the modelling.

The Hoover Art Co., in "Portrait of Miss Ruebens" (3) and "Portrait of Miss Ruth Frank" (7), exhibit a soft and diffused method of lighting-treatment, quite suitable to such charming subjects, but likely to pall if adopted as a general style. Another work of soft quality is "Margery" (43), by Robert Chalmers, which exhibits a very successful arrangement of the subject.

Something entirely modern in style and design has been attempted by Florence Vandamm in the decorative sort of portrait called "Allinson" (57). It is a head of a young man in a dominating hat, the print being longer horizontally than vertically. It has exquisite quality and the modelling upon the cheek is particularly admirable. "Head of a Lady" (111), by H. Essenhigh Corke, has also excellent quality; but his babies are more successful this year. A life-sized "Baby" (60) and a "Child Portrait" (82) are both extremely pretty, particularly the latter, by reason of the engaging way the little one holds an apple.

We are accustomed to novelties and modern ideas from Mrs. Mania Pearson, who sometimes oversteps the bounds of safety in her attempts to be arresting. We are disposed to think that "The Aeroplane Hat" (5) suffers on this account, charming as it is in quality and treatment. The hat itself savours of revue millinery, and the pose of the lady is similarly without reason.

Two strong portraits, apparently in coloured gum-bichromate, are arresting in a more legitimate way: one is "Richard Hall, Painter" (80) and the other "The French Caricaturist, Henri Stein" (81). They are by A. Motteau, who has treated them in a forcible and rather heavy manner, emulating the popular idea of what an oil-painting should be. As examples of coloured prints, they are as successful as anything we remember to have seen in portraiture, which, however, is not saying much. Their antithesis is seen in three exquisite and delicate little prints in pale tones by Charles Peabody, of which the finest by far is "Miss Peabody" (97), which, in regard to posing and arrangement, leaves nothing to be desired.

A novel idea is exploited by W. Foster Brigham, who has gone to the trouble of photographing the reflection, in the mirror of a sideboard, of a lady who stands at a window. The subject is a nice one; but the advantage of the plan adopted in "In the Sideboard" (109) over a direct view is not apparent, since the sideboard itself is all but non-existent in the result. Possibly the double distance from the camera which the mirror secures has led the photographer to avail himself of the ruse.

J. McIntosh is not a constant exhibitor by any means, and we are glad to welcome, as a sign of his maintained enthusiasm, the excellent portrait of "W. B. Ferguson, K.C., M.A." (92), whose head is splendidly modelled.

One or two nude studies are of interest, the most successful from the point of view of posing being Louis J. Steele's "After the Bath" (117), which has deservedly received a medal. This is a charming exercise in posing and lighting. Angus Basil's "Child Study" (100) seems a little hard by reason of its skilfully managed contrasts of dark and light against a rather aggressive background.

The whole show has quite a distinguished air, and to be represented amongst its good company is, indeed, a distinction in itself.

A PERSONAL IMPRESSION BY F. C. TILNEY.

The first score of prints hanging on the walls of the gallery in the premises of the Royal Photographic Society in Russell Square determine the artistic success of the exhibition. There is a little falling off in quality as one makes the tour of the room; but that is always the case. The wisdom of crowding all the best work in the wall-space first visited is to be doubted. Expectations are by this plan raised high, only to suffer a gradual but inevitable lowering, which at the same time lowers the spirits and appreciation of the spectator. Yet this course is always adopted. Some day an innovating spirit will try the opposite method, and so lead the critic's judgment through a rising scale of enthusiasm until it finishes in breathless admiration at the *pièce de resistance.*

However, one must admit that, small though the show is, its merit is certainly great, and, unlike the London Salon, there does not appear to be a swamping of the home article by prints brought from overseas, although here, as in Pall Mall, examples of American work are outstanding.

Perhaps the most noticeable of all are the two portraits by N. E. Luboshez (15 and 19), the first of which is a speaking likeness of Dr. Kenneth Mees. Both these heads are finely treated, in a downright, frank, and simple manner; well lit, conventional, but highly effective as to lighting; rich in tone, with dark backgrounds and thoroughly masculine in treatment.

Other portraits of sweetness rather than strength are by H. van Wadenoyen, jun. (14 and 18). They are delightful exercises in lighting and have great charm of treatment.

In landscape there are prints of unusual strength. J. W. Lumb contributes two highly artistic works: "The Peak Country" (121) and "The New Suburb" (2). Perhaps the latter is the finer achievement, since it is a good effort in picture-making with material of a slightly-commonplace nature, and for that reason reflects the more credit on the photographer; but both are replete with feeling. Equally charming, though quite different in style, is the grey, misty view called "Evening on the Thames" (27), and sent by Walter Selfe. I have seen many examples of Mr. Selfe's river work, but rarely one surpassing this tender little idyll, with its full atmosphere and its truth of effect. The sun struggling through the vaporous veil is beautifully rendered. The old houses in "St. Mary's Lane, Tewkesbury" (30) show that G. B. Clifton grows better and better in his output.

A good note is struck in A. S. Roberts "Amiens" (8) where a tree in the foreground creates a heavy shade, beyond which the town is seen in all the charm of bright half tones and reduced scale. Dr. S. T. Steward's "Barmouth" (10) is a purely "photographic" but likewise eminently artistic view of that delightful spot on the Welsh Coast. It is a most valuable example of how safely the camera may be trusted to render artistic quality, nuance, tone values, light and atmosphere without seeking the aid of control. It is not a dreamy thing by any means, but sharp and taking as views are sometimes under certain natural conditions. The dreamy and romantic is offered by H. Y. Summons who sends two magnificent moonlight effects, "An Impression of Thebes" (13) and "A Souvenir of a Bygone Day" (21). Whether these prints are really from moonlight exposures or not scarcely matters, since they look as though they were. If they were not, then they have been controlled, and that to excellent purpose. Their breadth of effect and their tender mood mark them out as amongst the leading prints of the year anywhere. What charmed me in them both was the admirable luminosity of the dark skies—a most difficult achievement. In the "Souvenir of a Bygone Day" this characteristic is truly remarkable. Mr. Summons's "Lybian Mountains" (99) are stupendous.

For sheer beauty of quality "King's Lynn" (74), by T. H. B. Scott, has not been beaten in this year's output of work from any source. It is indescribable and indefinable; but it makes the picture, in all other respects not above the average, one of haunting charm.

Something similar may be said of Floyd Vail's "Abandoned Mill" (101), which likewise has considerable quality but is not strong in composition.

Amongst figure subjects of the usual kind and fancy portraits by Mrs. M. Pearson, and others, there are one or two nudes that are artistically managed. A beautiful study by L. J. Steele, called "After the Bathe" (117) shows excellent posing, and is perfectly Greek in manner. Another by Dr. Evershed, called "Allegory" (6) owes its success to the management of its dark tone rather than to its posing or composition. The little skull in the background is a touch that seems to sound an insincere note, and the meaning of the allegory is elusive.

Small as it is, the exhibition is highly interesting, and has the advantage of not making too lengthy a demand upon the physical powers of the spectator. One can enjoy it without getting gallery headache, or experiencing that bored feeling which a plethora of photographs brings, surely, to a critic who feels an obligation to see everything and keep his faculties fresh.

F. C. TILNEY.

MATTERS OF PROFESSIONAL MOMENT.

(Presidential Address by Mr. E. Drummond Young before the Edinburgh Society of Professional Photographers.)

LADIES AND GENTLEMEN,—In this our first meeting of a regular session it has devolved upon me to fill the programme by providing something to discuss, to agree or disagree about. In looking for a subject of which I know anything various themes occurred to me, all to be discarded, then I thought the best thing I could do would be to take up the prospective work of the Society and sketch a programme. When this was settled ideas began to come, and I will try and put some of them before you.

I feel that with some energy and enthusiasm we have a big field for our activities. We have just had experience, in our combined holiday, of one small phase of the common action that can be arranged.

The great thing is to keep the Society a live society, and for that it must accomplish useful and interesting work. My idea is that we ought to have a permanent job.

With the new legislation shortly coming into force affecting the training of apprentices we should be ready to control this, and our Society be such that our authority will be recognised in the matter. I have approached the School Board with the suggestion that a class for retouchers might be instituted—a class for which there is a crying need, and which might lead to much bigger and wider efforts towards giving our assistants an intelligent and thorough training. Suppose that the Educational authorities institute a course, could we not form a committee and, working in conjunction with the Board, conduct an advanced class, something after the manner of R.A. and R.S.A. Life Class, for the teaching of artistic portraiture professionally? I see no reason why we should not grant a certificate of real value to the assistant.

There is so much nonsense talked about art—art terms are so much abused and misunderstood—that a course of composition, a knowledge of the human figure, and the correct modelling of the face would dispel in a great measure and, coupled with a sound technical training, give us very soon a body of very valuable assistants, and raise the standard of photography.

This appeals to me as a most valuable work for the Society to take up, and would more than justify our existence, and then think of the boon to ourselves! We all suffer from time to time—and, judging from some photographers' remarks, some all the time—from incompetent help.

There is another aspect, and that is the benefit to ourselves if we become a teaching body. We will have to exert ourselves, to think of our profession in a clearer manner, to look for varied methods of expression apart from the little dodges of altering the shape of the mount or calling the photograph by a different name; not that I condemn these variants from a business point of view, but these methods do nothing towards the improvement of portraiture.

To come back to the suggested retouching class. I was asked to lay before the Board a note of what would be required for this class. I may here mention why I suggested retouching as the subject for the class. It struck me as being very much needed and most easily started, as there are plenty of modelling classes. A few retouching desks and one or two plaster busts would be all that is necessary. I proposed that the desks, of simple construction, be set round a table with a central light, as the classes would be held in the evening. If it is not possible to run the course in conjunction with modelling, I would have the students do a certain amount of simple and rapid drawing. Say in a class of twelve have six desks, and while six study the plaster casts with paper and pencil (no matter how elementary the drawing efforts), the other six could work on negatives. The plaster casts should be polished, and a strong lighting arranged and, of course, varied, so that the student would see the shapes of the shadows and where the high-lights struck, forcing on the student the light and shade and construction of a head. They would also be shown against light and dark backgrounds. I feel pretty sure that after a course as suggested the student would know better than to put a high-light down the centre of the nose, irrespective of the lighting, an example of retouching I have seen more than once.

Now, that is one idea. Another that I thought of: advertising in photography seems to me a great problem. We can't have white sales or fire sales, or anything of that nature, and yet the more advertising we can do the better for us all. It stimulates the demand for photographs. Co-operation might come into this, and perhaps some member might give the subject a thought and fill in an evening.

One sphere for co-operation suggests itself, and that is a joint printing establishment. Of course, I hear its disadvantages shouted at once: lack of control, loss of individuality, trouble of not having the printing done under the same roof, and so on; there is no end to what may be said against it. But let me point out some of the benefits. First, it would be cheaper, even allowing for the present printing rooms left empty. Secondly, we could afford to have the best and most experienced printers in every process. We would be able to experiment in new papers. The premises would be fitted out in the most convenient site and manner, and a host of other advantages will occur to anyone who will turn the idea over in the mind. Is there any photographer here who would not be glad to be relieved of the worries of the printing room?

Someone says lack of control. Exactly! Just what is wanted. You are free of controlling printers and printing. That is done for you. All you have to do is to call for your prints, printed to suit your particular taste and in any medium that you fancy.

I am safe in saying that most of us, at one time or another, have some printing done outside, and find it satisfactory. How much more so if our work was regularly printed? In the printing shop it would soon be known that Brown liked his prints a little bit under-printed and Green liked his on the dark side. Naturally it would take managing. For instance, no photographer getting his work done there would be at liberty to enter the working room or rooms. Each firm's work would be kept private. It might be advisable for firms to have private lockers, the head printer or manager to look after them; an elected committee to watch the running of the plan. I think if each firm joining took shares and paid for their printing, then the profits would be divided so much on the shares and so much on the printing. But this is a matter that can be settled, if necessary, by a cleverer business man than I am. The point to adjust is that no one may put in a lot of capital and have no printing done, and yet profit unduly over the man who has little capital and gets a lot of printing done, and vice versa. I might elaborate this scheme further, but this is sufficient. As I said at the beginning, these are just a few ideas I am putting before you. If they come to anything we shall have plenty of elaboration.

Now, another thing we want to attend to: What is going to be our attitude towards materials of enemy manufacture? Some of them were good—the Koh-i-noor leads, for instance. Will we be flooded after the war with Hun goods? I don't expect to get a motion for a formal boycott to-night, but we can keep the point in mind. Talking of enemy goods brings us to the inequity and bullying of our home suppliers. I refer to the recent plate-ring legislation. We don't complain of the price; one knows that everything is dearer, but the stipulation that 75 per cent. of plates must be returned, that they must be packed and carriage paid, is too much. From what I have heard, the plate-ring have quite a song about glass.

Well, I say, why didn't they take the glass when it was offered to them? That was my experience. It is not as if the re-coating of old plates was a new idea. In 1902 I was working in America, and we returned to the plate-makers our used plates, mostly 7 x 5, and were paid for them. Oh, where is our co-operative plate factory? In 1903, I think, a film on paper was demonstrated in Edinburgh. It was on a paper support, and was stripped after development and fixing when dry. The negative had very good quality, and was especially useful for working on and in carbon printing. If it were sent out on spools and used in a carrier, how convenient for the studio!—no plate changing, just roll it up like a film hand camera, and cut off the length at the end of the day. I make no charge to the plate-ring for this idea.

There is another point I might touch on, but very lightly, because I know many photographers are a little shy of it, and that is prices. Lately I found that some of my photographs were too cheap, at least that I was getting less than some other firms who were in the same class of business, and in talking over the matter with another photographer he confessed to the same experience. We have both put the matter right, and derived some mutual benefit from our discussion. On this matter I make no suggestion. Perhaps some braver member may speak on the matter.

One thing I would like to point out. After the war we are likely to have a Parliament here, and other matters will make Edinburgh a more important, or I should say a busier, city. This will bring competition from outside, and to meet this it is necessary that we should be so good and so strong that it won't be "worth while" for the outsider.

To return to the educational idea. We should, whenever the meetings permit as regards subject, throw the evening open to all professional photographers and assistants, whether members or not.

At the risk of being wearisome I would emphasise the educational aspect. What is the standing of photography as a profession? It crops up every little while in the journals. Does the average photographer proclaim with pride that he is a photographer? I think that one has only to look at the signs and name-plates, the notepaper headings, to see that the plain statement of his calling as a photographer has no weight, and this is not as it should be, and I think is largely due to the fact that we don't do anything for the educating of our assistants. It is forgotten that the assistant of to-day is the master photographer of to-morrow. There is another want, and that is a lack of unity. We don't know each other. Very often if you know another photographer, it is not because he is a photographer. You got to know him through something entirely outside of your common business. But take doctors, lawyers, accountants, dentists; there is a professional intimacy among them, and that is largely due to the fact that all their professions look after the education of their successors.

Now, here is our Society; it is small, only one city, and not all the photographers in the city have become members yet; but could we not, with a little work and goodwill, do our utmost in the way of education—always an important matter in Scotland—and so bring about in our small sphere that unity and professional pride advancing our standards and status? It seems to me the best way to obtain that professional position for our calling.

I notice that some English towns are doing quite a lot educationally. How it is controlled I don't know, but I maintain that photographers should do this themselves. So far I haven't said anything about the technical side, because I feel that so much photography is, or can be, mechanical; but its importance must not be overlooked, and when the new Act comes into force in about three years' time apprentices will have to spend part of their time at day classes. This is already being taken up by many of the trades in Edinburgh, and classes formed. One of the difficulties to me is to get a knowledge of, say, chemistry, of which I confess my ignorance; but I believe one has to go through so much and advance quite a distance before the subject is of any use to a photographer. Now, we don't want to become chemists, but we really need a knowledge of certain actions in chemistry, and so in other matters that touch our occupation. Even in art training, while the principles of art are the same in all mediums, it is not necessary to become a finished painter or modeller to make works of art by the camera.

A little while back I spoke of combined advertising, and I thought of not so much advertising your photographs or my photograph, but advertising professional photography.

Now, what about an exhibition of professional photography? *The British Journal* had one some years ago, but I do not know of any body of professionals doing this for themselves, and it would be new to Edinburgh. It would give the public a chance to see professional work under the best conditions, and with plenty of publicity I feel sure would create a great deal of interest.

The idea was mooted among a few of us some years ago, but did not materialise. Of course, there would be no awards. Possibly the best way would be for each member to take space, and he would be free to hang anything he liked on that space as long as it was work he did in his business.

Provided a sufficient number of entries were secured the cost would not be great, and there would be no difficulty about getting a place.

I do not wish to take up more of your time, as what I have tried to put before you are only a few ideas or suggestions for our activities, and, as I said when beginning, we have to agree or disagree, and that takes time.

Before I finish I will add one or two further fields of work. One is to keep a register for assistants wanting situations. A note also could be kept of cases where members have not been treated fairly in buying materials. This last came to me when talking to one of our members. I asked him if he dealt with a certain firm. He said, "No, we gave an order that didn't turn out according to specification." It happened that I had the same experience, and had heard of another case. And to close, to carry on, we must have attendance at the meetings. It is no use for a man to say I am with you in spirit; in this case the spirit is weak.

E. Drummond Young.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication

Filling the Plate for Enlarging.

A great deal of work is now done on comparatively small plates, with a view to subsequent enlarging, and this practice will probably spread considerably in view of the high cost and increasing scarcity of plates. There is a strong temptation for the operator to take less trouble in "filling" the subject on the plate, especially if someone else does the printing, and so long as it is all on the ground-glass he may be satisfied to leave the adjustment of size to the enlarging stage.

The most satisfactory method, however, is to try to arrange for the enlarging to be as free from added complications and as nearly in line with contact printing as possible, especially as it is usually done by less skilled labour and under greater pressure of time than operating. At the same time, the filling of the subject for subsequent enlarging calls for a little closer attention than for contact printing. In the case, say, of heads photographed on 3½ x 2½ plates for enlarging to cabinet size, differences in the sizes of the faces will be just about doubled, and the variation in the finished productions will be very noticeable.

Where a standard style is turned out for a stated price it is easy to make guide marks on the focussing-screen, and in the case of general commercial and copying work it is just as easy to fill the plate correctly for enlarging as it is for contact printing. To make the image smaller than it need be [illegible] the chances of accentuating faults and mechanical defects.—Surrey.

The Men who had No Time

Several men I have known were always complaining that they had "no time." The man who lost his shadow was one of the most tragic, if mythical, figures in history, but to have "no time" [illegible] more pathetic. And so it is.

One man I knew had a leaky dark-slide. It had given way at one corner years before I met him, but he had had no time to mend it. By keeping it well covered with a cloth he managed to keep his plates free from fog till one day the playful zephyr lifted his focussing-cloth just as he was exposing his last plate on a subject miles from home. The next day he found, to his great surprise, a [illegible] of the time that he had lost, so he [illegible] for a pennyworth of glue and mended his dark-slide.

Another of these unfortunate people had never seen an exposure meter. He had no time even to look at one. Besides, he had no need to. Could he not tell the exposure for every sort of subject, with every sort of plate, and under all conditions of weather, merely by looking at the ground-glass, with his right eye screwed up small and his left eye stretched wide open? I knew he could because he told me so!

When anything chanced to go wrong—and it often did—it might be by reason of bad plates, or his assistant had mixed hypo in the developer (it's been known!), but it could not possibly be the exposure that was wrong. He had no time for such stupid arguments. He knew. And he had no time. Good morning!

One more timeless person begs a little of your time. He, poor man, was scarcely able to wash and dress and swallow a hasty mouthful before catching the last workman's train in the morning. Certainly he was seldom able to include shaving in the programme, still less to kiss his worthy spouse before leaving the house or even on his evening return. He had no time to read the paper except at meals, and none at all to read the *B.J.* He had many other troubles, and his wife didn't sympathise *one bit.*

Oh, no! I'm not sticking a "moral" on the end of this fable, and if you look for the "happy ending" to my tale it is not yet, for all these friends of mine are in the army, and he that knew all about exposure has had an overdose, and he that shaved not now shaves each morning by sunrise, and because he kissed not his wife she sends him no parcels.—E. N.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Film-drying Reels.—No. 117,425. (March 19, 1918.) When a lengthy film of celluloid has been coated on one side with emulsion, and the coating has sufficiently set, it is customary to wind the film upon a reel, whereon it is left to become thoroughly air-dried. In order to prevent contact of the convolutions one with another and ensure the maintenance of a sufficient air-space between them, there is wound upon the reel, along with the film, a so-called apron, the convolutions of which alternate with those of the film, this apron being constituted by a series of equidistant cross bars of wood extending parallel to the axis of the reel and connected together at each edge of the apron by a flexible band provided with distance-pieces of a height corresponding to the required depth of interspace between successive convolutions of the film, the non-sensitised surface of which alone contacts with the cross bars.

The flexible marginal band of the apron have in some cases been formed of leather, the employment of which material is open to objection for various reasons, and it has been proposed to substitute for the leather bands chains of light sheet-metal stampings hinged together; each stamping, which constitutes a single link for the support of two adjacent cross-bars, being in part offset to such a distance from that surface of the cross-bars with which the back of the film contacts as to afford free access of air between superposed links in successive convolutions of the apron. The offset portions of these links have, however, been found liable to become crushed or distorted under the relatively considerable strain due to the load of a filled reel, with the result that not only is the interspace between the convolutions reduced, but the alignment of the apron is apt to be interfered with. The primary object of the invention is to provide an improved construction of link which shall remedy this defect.

The improved link, which is formed as before of sheet metal, comprises a pair of sockets for the reception not only of the ends of a pair of adjacent cross-bars of the apron, but also of a pair of solid packing-blocks superposed upon the ends of the cross-bars, each socket being of a total height, normal to the general surface of the apron, which exceeds the thickness of a cross-bar by the radial depth of the interspace between successive convolutions of the apron cross-bars upon the drying reel, and the packing blocks filling the excess height of the sockets so as to prevent crushing of the sockets when the apron is wound upon the reel.

The sockets are extended lengthwise of the apron in opposite directions respectively so far beyond the corresponding cross-bars and packing blocks as to render the total length of the link equal to double the pitch at which the cross-bars are spaced apart; the respective socket extensions constituting oppositely-directed terminals of rounded profile having a height substantially equal to that of the sockets themselves and adapted to abut against and roll in contact with the continuous terminals of adjacent links of the chain to which they are hinged. The improved link is preferably made from a single strip of sheet

Fig. 2.

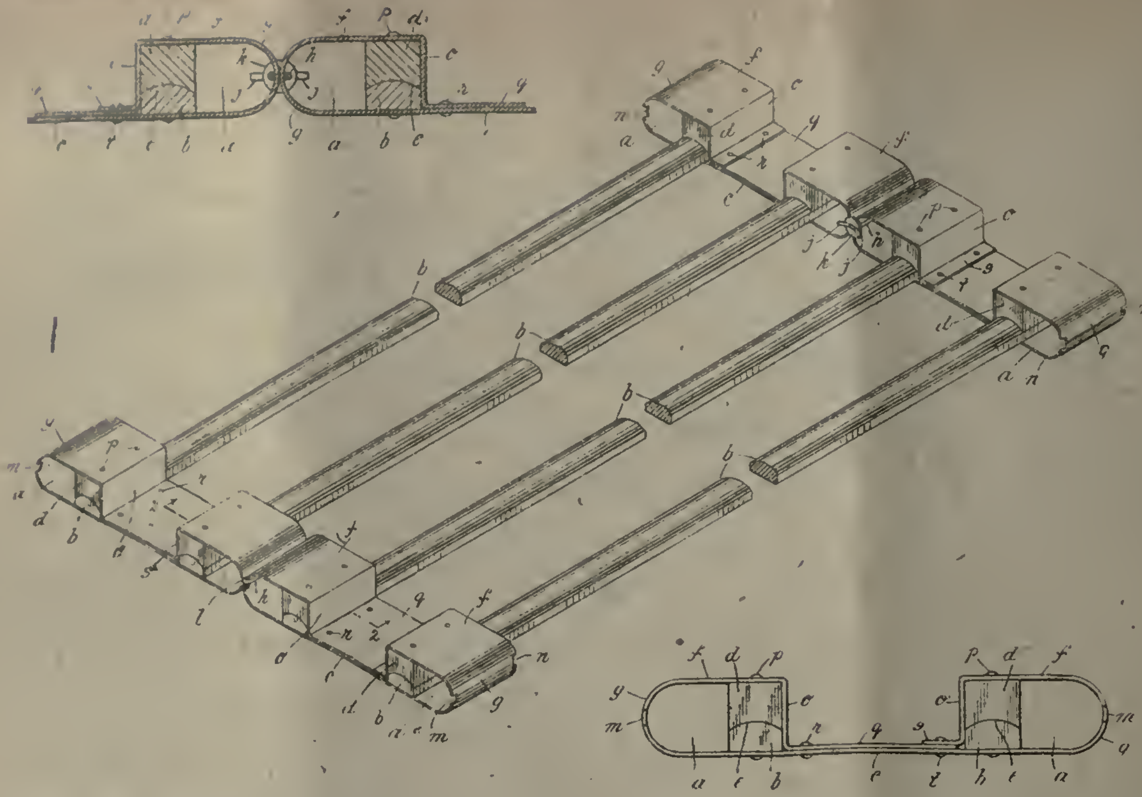

Fig. 1.

Fig. 3.

metal, and has that portion which connects the two sections together formed of a double thickness of said strip.

In the example illustrated, the improved link consists of a single strip of sheet-metal, having parallel edges, bent up so as to form at the opposite ends of the link a pair of similar sockets *a*, *a* for the ends of a pair of adjacent cross-bars *b*, *b* of the apron; both sockets *a*, *a* being offset from the outer side of a substantially flat connecting-piece *c*. The height of each socket exceeds the thickness of a cross-bar by the radial depth of the interspace required between successive convolutions of the apron when the latter is wound upon the film-drying reel, a packing-block *d* of solid wood, of the same width as the cross-bar *b*, being fitted in each socket between the rounded outer surface *e* of the cross-bar and the outer wall *f* of the socket so as to obviate any risk of the socket being crushed by pressure in a direction normal to the general surface of the apron.

The sockets *a*, *a* of the link are extended lengthwise of the apron in opposite directions respectively so far beyond the corresponding cross-bars *b*, *b* and packing blocks *d*, *d* as to render the total length of the link equal to double the pitch of the cross-bars; both of the outer ends *g*, *g* of the link being bent to a semi-circular profile as shown, so as to permit of the mutually-abutting ends of successive links of the chain rolling freely in contact with one another (see *fig.* 2). Adjacent links of the chain are hinged together by means of a wire staple *h* of **U**-shape, whose limbs are inserted through the contiguous sockets of the respective links; the ends *j*, *j* of the limbs being passed through a slot in a circular washer *k* and thereafter bent outwards from one another so as to prevent withdrawal of the staple. In order to retain the staple *h* in position, its bow *l* (*fig.* 1) is received in a pair of notches *m* cut in the edges of both the contiguous sockets *a*, *a* at one end of the latter whilst the washer *k* is received in a similar but wider pair of notches *n* cut in the edges of both contiguous sockets at their opposite end, as indicated.

The inner sides *o*, *o* of the sockets *a*, *a* extend in planes normal to the general plane of the connecting-piece *c* and in contact with the corresponding edges of the cross-bars *b*, *b* and *packing-blocks* *d*, *d*; each cross-bar and its packing-piece being secured in position within their socket by means of rivets *p*. One end portion *q* of the strip forming the link overlies the connecting-piece *c* between the sockets *o*, *o* and is riveted thereto at *r*, the portion *q* extending the entire distance between the sockets, while the other end portion *s* of the strip is shorter and overlaps the extreme end of the portion *q*, to which, and to the back *c*, it is riveted at *t*. The connecting-piece between the sockets is thus formed in effect by a double thickness *c*, *q*, but retains sufficient flexibility to be capable of accommodating itself to the contour of the apron-convolutions on the drying reel.—Newton Livingstone Scott, Lauriston, Ashtead.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, OCTOBER 21.

Bradford Photographic Society. Members' Print Exhibition Night. Exchange and Sale of surplus apparatus.

TUESDAY, OCTOBER 22.

Manchester Amateur Photographic Society. Open Lantern Meeting and Lecturette. F. Rigby.

WEDNESDAY, OCTOBER 23.

Croydon Camera Club. "Some British Birds and their Homes." F. R. D. Onslow.

THURSDAY, OCTOBER 24.

Brighouse Photographic Society. "Nature Poets and Nature Pictures." F. Lund.

Hammersmith Hampshire House Photographic Society. "Among the Cornish Fisher Folks." W. Thomas.

Huddersfield Naturalist and Photographic Society. "The Manor of Almondbury." W. H. Sikes.

ROYAL PHOTOGRAPHIC SOCIETY.

MEETING held Tuesday, October 15, The President, Dr. C. Atkin Swan, in the chair.

The twenty-first Traill Taylor Memorial Lecture was delivered by Mr. F. Twyman, who took for his subject "Interferometers for Testing Lenses." While it is difficult to present a résumé of a technical discourse upon applied optics, in which full advantage was taken of diagrams and photographs, it is possible to give some idea of the subject matter of the paper which, undoubtedly, is a valuable contribution to the literature of testing optical instruments, including photographic lenses. Mr. Twyman pointed out that from various causes there was still considerable room for improvement in optical instruments, even when regard was paid to the performance of those of the highest optical quality hitherto realised. In the case of photographic lenses in particular one limiting cause was the necessity of securing at one and the same time corrections of a higher order for both oblique and axial pencils. Another was the limited choice of available refractive material for the production of highly corrected instruments, the elements in which are of spherical surface. In the case of large lenses and prisms want of homogeneity of the glass was a further cause of imperfection. These obstacles in the way of optical instruments of greater perfection were in some cases in course of being removed. A greater variety of glasses was becoming available: mathematicians were seeking to assist the lens calculator: and a first step had been made in the direction of producing lenses of non-spherical surface. The firm of Carl Zeiss, the lecturer said, had patented a method of producing glasses of non-spherical surface, and no doubt was keeping other methods secret. Apparently, these methods had not been brought to sufficient perfection for application to telescope or camera lenses, but by the use of the interferometer designed by the lecturer opticians might contemplate the production of non-spherical surfaces with ample precision.

By means of a series of photographs, Mr. Twyman showed examples of various degrees of optical performance in the forms of giving a point image of a point-source, of flatness of field, and of absence of distortion.

Mr. Twyman proceeded to describe, with the aid of diagrams, the different forms, or rather the modifications, of the original form of the interferometer evolved in the workshops of Adam Hilger, Limited, and derived from the Michelson interferometer with the main difference that the two interfering beams of light come to a focus at the observer's eye. He showed a series of photographs representing the phenomena which are observed in the use of the interferometer for testing a lens. Defects, such as distortion, astigmatism, coma, or spherical aberration were immediately recognisable; whilst a special adaptation of the instrument for testing photographic lenses permitted of pencils of any given obliquity being examined and the performance of the lens at various angular zones of its field thus ascertained.

On the proposition of Mr. W. B. Ferguson, seconded by Mr. F. F. Renwick, the heartiest thanks of the meeting were accorded to the lecturer by acclamation. The chairman then presented the lecturer with the Traill Taylor Memorial Medal.

Mr. Twyman's acknowledgment brought the proceedings to a close.

CROYDON CAMERA CLUB.

In the language of the fixture list, Mr. F. C. Tilney "discussed the results of control methods of printing from an artist's point of view," a subject which at first sight may open out visions of a violent conflict with the lecturer fighting gallantly to the last drink against great odds. But, unfortunately, nothing of the sort occurred. In the first place, the lecture was so artfully phrased as to interfere seriously with nobody's susceptibilities; and, secondly, the finer feelings of the purists have been battered by [illegible] and Westons in the past that the [illegible] [illegible] an [illegible] of rationality by comparison. Owing to its crystalline structure the diamond suffers severely by compression. Mr. Tilney opened by saying he was aware a title indicated little at Croydon, but he meant to stick, with reservations and limitations, to the one allotted him by the secretary. He was also aware that if he were to talk on the technicalities of control processes he would be exposed to grave danger, and the club to the entertainment tax. When the Bromoil process was first introduced he splashed and splattered about with it, but proposed that evening dealing only with abstract considerations of "control." Of the three factors—How, Where, and Why—he should treat only of the last. On this endless discussions had taken place, and there was much to be said for both contending parties. Largely the conflict of opinion was based on division in ideals or standpoints, some having a fundamental idea that a straight print could not be artistic. But there were times when a perfectly straight print stood, and it was a great mistake to imagine, as some appeared to do, that every print must be faked.

Photography could be divided into two broad classes, the scientific and the artistic, and [illegible] the latter a great debt to the craft. The photographic artist was furnished with an apparatus which normally rendered more than an artistic eye wanted to see, and therefore was not the best for his special aspirations. On the question of exposure, the old maxim of exposing for the shadows had often murdered a picture. It was certaintly true that all do not see alike. For instance, for all he knew, their worthy president, Mr. Catharine, might be seeing his whisky of a green hue. (Laughter, and a voice, "Double.") Artists made allowances for each other in this respect, and the variation added materially to the interests of art. This difference of vision worked in a circle, for what one saw fed the impressions and strengthened the temperament, and finally tended to groove the mind. This was shown both in painting and literature. The same argument could not be applied to the art of the camera, and in his opinion it was more difficult to make pictures by photography than in any other graphic art.

Assume a photographer has set out honestly to secure a certain effect, but fails to get exactly what he wants. He may put up with the result as being something near the mark, and suffer at the hands of the critics for not having reached it. On the other hand, he may wish to get closer to the realisation of the effect sought, and this opened the door to "control," often resulting in falsification. He is then jumped upon by the purists. As a matter of fact, it was the beastly copyist who arrived to spoil everything; one responsible for nine-tenths of the rubbish paraded as artistic photography. The only justification for control was when a straight print failed to render the original intention. To falsify was to make the thing unphotographic and contemptible.

The discussion was opened by Mr. E. A. Salt, who accused Mr. Tilney of framing his lecture on armistice lines. The lurid unreality of a large number of controlled prints, such as Bromoils, could be felt even if one were not clever enough to detect what had led up to the general air of falsity. Doubtless this was due to the fact that they were the work of men without art training. A true creative artist would display his talent by pen or brush in infancy; indeed, would be irresistibly compelled so to do. Consequently, those not so gifted were creatively lesser men, of inferior grade in an artistic sense, yet without the training and keen perception of those far more gifted by Nature, they unblushingly and without restraint built up horrible hybrid productions at their wicked leisure.—Mr. F. C. Reynolds approved the broad classification made by the lecturer. An instantaneous exposure of a horse trotting gave the scientific rendering which from an artistic standpoint might be hopeless. Again, the eye and the lens were essentially different, and compromise in pictorial work was necessary.—The Rev. O. W. Le Warre was uncertain whether Mr. Tilney favoured "control" or not; it could only be successfully exercised by those of artistic perception. He denied that various eyes saw things differently, the variation of rendering being purely due to temperament.—Mr. J. M. Sellors dissented. If one were seized of a liver all was damnable, but if full of beans everything was all right.

Mr. Tilney, in a short reply, said he favoured control when it was legitimate. No picture could be made out of things, only out of *effects* of things. He agreed that a creative artist would be compelled to express himself by pencil or brush. Unfortunately, the joy of creating was not for the photographer, though the practice of photography induced enthusiasm. It was of great value in introducing art into the lives of many who otherwise might never feel its influence.—A most hearty vote of thanks was accorded Mr. Tilney for a first-rate and highly interesting lecture, delivered at the end of a long and tiring day on the Trafalgar Square stunt.

Edinburgh Society of Professional Photographers.—The fourth meeting of the Edinburgh Society of Professional Photographers was held at Mr. Balmain's Studio, 69, Shandwick Place, on Monday, October 7, 1918. Present were:—Mr. Drummond Young (in the chair), Messrs. Johnston, Campbell Harper, Paterson, Swan Watson, Aikman, Bambrick, Laing, Fergusson, Lauder, Barrie, Yerbury, Moffat, and Miss D'Arcy, Miss Gray, and Miss Bertram.

At the opening of the meeting Mr. Young announced that news had just been received that Mr. Balmain's youngest son, Captain Roy F. Balmain, M.C., R.F.A., had died of wounds in France. The meeting thereupon expressed a desire to communicate its sympathy to Mr. Balmain in his loss, and the secretary was instructed to write to Mr. Balmain on behalf of those present.

This was the first annual general meeting, but, there being no office-bearers to elect or other customary business to transact, the secretary merely announced that the membership now stood at 25, and gave a statement of the accounts. Membership cards, with a list of rules, were handed out to those present.

The chairman then mentioned that a lecture on the principles and construction of emulsion developing papers had been partially arranged to be given by an expert, and it was proposed that this should take place on the following meeting in November. It was pointed out that assistants should be invited to attend this lecture, and it was thought that an audience of about 50, exclusive of members, could be raised in this way.

The December meeting having been set apart to take the form of a social evening, it was suggested that a small dinner should be held, and that a short musical programme should follow. Messrs. Swan Watson and Campbell Harper, along with the chairman, were asked to arrange this matter.

Mr. Young then announced that an associate of the R.S.A. had offered to give a criticism on any photographic prints or illustrations which members cared to bring for that purpose. and it was suggested that this should form the subject of January's meeting.

The chairman then delivered his inaugural address (reported on page 469), and dealt with a number of interesting and useful ideas, which he suggested might form the basis of discussions throughout the session, and, if found advisable, should be adopted and carried out by the society.

With regard to the retouching class for assistants, Mr. Young explained that he was already in communication with the School Board authorities, and developments were expected shortly. He emphasised the need and value of training assistants in the various branches of the profession—if only as a means of elevating the status of photographers. The proposal of the retouching class was greeted with general approval, and members emphasised the great necessity for such a means of training, and testified also to the eagerness with which assistants welcomed the idea of education in this branch. The inadequacy of the present course of training at the art school, for the purposes of photography, was generally discussed, and the adoption of this proposal was urged.

Mr. Johnston proposed that, the discussion of all these important points should be allocated to a future date or dates, and the drawing up of a syllabus on these lines was left in the hands of a committee.

With reference to the co-operative plate factory, no notice having been taken of the society's order for four gross of half-plates, Mr. Swan Watson proposed that a letter be sent inquiring into this matter. Mr. Watson then moved a hearty vote of thanks to Mr. Moffat, who, it was discovered, had been the originator of the holiday closing scheme.

After some discussion on the forthcoming rationing of light, the meeting closed with a vote of thanks to Mr. Balmain for the use of his rooms.

South London Photographic Society.—At last week's meeting some very useful suggestions on mounting the prints were put forward by the members present. To prevent cockling of the mount and stretching of the print Mr. Edwards recommended that a small amount of mountant be placed on the centre of a sheet of plate-glass and evenly spread over the surface by the aid of a roller squeegee. The *dry* print should be laid down on the glass, face upwards, covered with a piece of white paper, and the whole carefully and quickly rolled into perfect contact with a clean roller squeegee. If this operation is carried out speedily it would be found that the print did not stretch and could be mounted without fear of any excessive cockling of the mount. It was pointed out that the movement of the brush (used to apply the mountant) across the back of the print helped it to stretch in all directions. His method avoided this. Most workers mark on the mount two points to work to when mounting; if all four are marked, placing the picture was quite a simple matter. A limp picture, when lifted by the top left-hand corner and bottom right-hand corner, will sag in the middle. Allow the print to sag, and lower it on to the mount so that the bottom left-hand and top right-hand corners adjust themselves to the marked points they have to cover or touch. When seen to be in correct position, lower the print on to the mount and squeegee into contact; this method ensured accuracy

W F Slater, F.R.P.S., described a specially home-made ruler for securing absolutely even side margins with the minimum amount of trouble. The ruler should be marked off in inches and proportions thereof, the centre being marked O and marked off and numbered on either side. If one had to mount, say, a 8 × 10-inch upright print on a 12 × 15 mount, the side margins can be determined thus: Place the mount face upwards on the bench or table, lay the ruler across and adjust so that both edges come up to the six-inch mark. The print, being 8 inches across the top, would have to come 4 inches on either side of the centre; the 4-inch points could be marked straight away and even margins secured.

Mr. E. C. Perry preferred not to mark his mount at all, and works upon the following basis:—The mount is placed face upwards on the table, the point placed as near as possible in the position it has to occupy, and a weight, which must be perfectly clean, placed on top. The print is then moved about until the two margins at the side are perfectly even; the measurements are made by the aid of an ingenious depth gauge, but a steel rule would answer just as well. The print has then to be adjusted for top and bottom margins. When all are correct, a steel tee-square is laid on the mount, close up to the left-hand edge of the print so that the top of the straight edge is in a direct line with the top of the print; a weight is then placed on the tee-square to prevent movement, the print removed, mountant applied, and replaced, taking care to work right up to the tee-square and to keep the top of the print in a line with the end of the tee-square.

Mr. Luboshez sent along his verdict on the prints submitted to him for judging, all of which were based upon his previous lecture on Portraiture Front Lighting. Mr. E. W. Brooks, the secretary, secured the first place with a 6 × 8 bromide portrait of a gentleman. The second place was secured by a toned portrait of a lady by Mr. Mauger.

Commercial & Legal Intelligence.

Notice of intended dividend is given in the failure of Frank Scott Russell (trading as Scott Russell and Co.), pictorial postcard dealer, 3, Highland Grove, Worksop, Notts, and formerly of 13, Albert Street, and 34, Martineau Street, both in Birmingham; 25, Huntriss Row, and 34, St. Nicholas Cliff, both in Scarborough; and 16, Change Alley, Sheffield. October 23 is the last day for lodging proofs with Mr. A. S. Cully, Official Receiver, Ruskin Chambers, 191, Corporation Street, Birmingham.

NEW COMPANIES.

Rosemont, Ltd.—This private company was registered on October 8, with a capital of £2,000 in £1 shares. Objects: To carry on the business of lithographers, artists, picture dealers, manufacturers of and dealers in engravings, prints, etc. The subscribers are L. E. Brown, 26, East Parade, Leeds, incorporated accountant; C. Brooke-Hughes, 30, Otley Road, Harrogate, photographer; first directors, J. H. Crowther, F. Rawson, B. Collinge, J. Fletcher, W. D. Perkins, C. Brooke-Hughes, and L. E. Brown.

Wallace Heaton, Ltd.—This private company was registered on October 9 with a capital of £10,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in photographic materials and apparatus, photographs, pictures, artists' materials, prints, and engravings, etc. The subscribers (each with one share) are: W. E. Heaton, Westwood, Grindleford, Derbyshire, photographic dealer; H. E. P. Beard, 45, Bank Street, Sheffield, C.A. W. E. Heaton is governing director. Registered office, 19, Change Alley, Sheffield.

The Late Mr. Alfred Booth.—The death is recorded of Mr. Alfred Booth, a professional photographer of Colwyn Bay. Mr. Booth was for many years a lithographic artist, and adopted photography as a business only in later life.

Eastman Kodak Company of New Jersey.—In addition to the usual quarterly dividends of 1½ per cent. (being at the rate of 6 per cent. per annum) upon the outstanding Preferred stock, and of 2½ per cent. (being at the rate of 10 per cent. per annum) upon the outstanding Common stock, the directors of the Eastman Kodak Company of New Jersey have declared an extra dividend of 7½ pe cent. upon the Common stock, all payable on January 2, 1919, t stockholders of record on November 30.

News and Notes.

Tribunal Appeals.—At Bath Local Tribunal T. C. Leaman, 45 (Grade 2), photographer, Corridor, who had been given three months' exemption, again applied. He stated he had lost his two men and now employed five girls. He had several months' work in hand, a large part of it military work. He had had three replies to his advertisement for someone to take on his business. One was from a man without capital, a second from a man since called up, and a third from a lady amateur.—Captain Little said photographers were most urgently needed in the R.A.F.—Mr. Leaman said his two former assistants were already in the Corps.—Certificate for two months to enable further efforts to be made, or alternatively, for Mr. Leaman to offer himself for part-time work.

War Photographs on Sale.—Colonel John Buchan of the Ministry of Information, formally opened last week premises in Coventry Street, Piccadilly Circus, as a bureau where the public will be able to obtain prints of British official photographs taken on the various battle fronts and at home.

The building has been fitted up as a gallery, with an exhibition of enlarged coloured reproductions vividly illustrating deeds of daring on the battlefield, besides numerous photographs relating to the varied war activities of the British Empire. There are also open to inspection albums, each photograph in which is distinguished by a number. Prints will be on sale from to-day at the following rates:—Size 8 ins. x 6 ins., 1s. 6d. each, 15s. a dozen; 10 ins. x 8 ins., 2s. and 20s.; 12 ins. x 10 ins., 3s. and 30s.; 15 ins. x 12 ins., 4s. and 40s. Sailors and soldiers may obtain copies at half these prices. Enlargements can be supplied in sepia, framed complete, in any size. The cost of one measuring 24 ins. x 20 ins. is £2 3s. 6d., and the price of the larger sizes is proportionate.

Colonel Buchan said he had been told that our war photographs had occasionally enabled a missing man to be traced. Photographs taken actually during battle were greatly appreciated by the relatives of the men who had fought and of those who had fallen. A lady had written asking for a photograph of her son, which, she said, she had seen accidentally and which was taken five minutes before he fell in action. He called attention to the comprehensive work of the Photographic Section of the Ministry of Information in compiling an accurate and complete war record, and to the difficult and dangerous work of photographers at the front.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

⁂ *We do not undertake responsibility for the opinions expressed by our correspondents.*

GLAZING PRINTS ON BOTH SIDES.

To the Editors.

Gentlemen,—Replying to your correspondent Mr. Dickin, we undertake the production of "photographs to be glazed on both sides." We require only one day longer than our usual scheduled time.—Yours truly,

A. H. Anderson, Manager.

134 to 140, Idle Road, Bradford.

To the Editors.

Gentlemen,—I would like to suggest [illegible] to those interested in making glossy prints on both sides. Unfortunately it is not easy stuff to buy; who are the makers now I cannot say, but without doubt it is purchasable in London, as it is used in calico colour printing, glazing paper, artificial flower making, leather goods, etc. I know by the use [illegible] and silvering have retained their [illegible] appearance on the paper, therefore it seems to be of use to photographers for commercial purposes, and probably is in use by sensitisers. Films equal to celluloid were made from it by casting on glass, celluloid being preferred by reasons of manufacture.—Yours faithfully,

A. Vernon Godbold.

Brockley, S.E.

THE CO-OPERATIVE PLATE WORKS.

To the Editors.

Gentlemen,—One has heard a good deal from time to time of the above plate works, but the deal one hears really amounts to very little.

The plate makers are supposed to be making huge profits; the Co-operative Works are offering 6½ per cent. on subscribed capital (no tremendous allurement in present times), and in view of the fact that they are charging the same prices as the plate makers one would be interested to know how the balance of the profits is to be distributed, and how much absorbed in management expenses.

Again, I have not noticed any report as to the quality of the plates turned out, of a sample being sent to the British Journal for review, or any offer to supply professional photographers with a small quantity to induce them to become shareholders if they find the plates suitable for their business. Another point arises. Can the Co-operative Works manufacture plates in sufficient quantities to enable it to cope with the demand from the number of shareholders it is prepared to take on?

I do not know to what extent capital is flowing into the Co-operative Plate Works, but the general impression amongst photographers of my acquaintance is that they cannot be expected to take much interest in an undertaking where so little information is given.—Yours faithfully,

Geo. Wilkinson.

837, High Road, Leytonstone, N.E.
October 9, 1918.

POSTAGE OF PICTORIAL CARDS.

To the Editors.

Gentlemen,—Since I wrote you last week I sent on a request to the Postmaster General for a pronouncement on the subject of the stamping of "Postcards" which contain either nothing in writing but dates and names and addresses of sender and addressee; or a conventional phrase of not more than five words. There is no need for me to give the whole letter, because it is rather lengthy, and I assure you I tried to cover all possible ramifications, with the satisfactory result that I to-day received a letter from the Postmaster General, of which the following is a copy:—

"I am directed by the Postmaster-General to refer to your communication of the 2nd inst., and to inform you that, as shown in the Supplement to the Post Office Guide, issued this month, printed Christmas, New Year, Easter, Birthday, Picture, Greeting and Visiting Cards are admissible at the inland printed paper rate of ½d. for 1 oz., provided:

"1. That nothing appears in writing except dates and names and addresses of sender and addressee.

"2. Formulas of courtesy or of a conventional character not exceeding five words or initials.

"The words 'Post Cards' should not appear on such cards, and it is desirable that the words 'printed paper' should be shown at the top left-hand corner of the front.

"If, however, the words 'Post Card' or 'Printed Paper' do not appear, picture cards may be used as postcards if prepaid 1d."

I should like to take this opportunity, therefore, of declaring that after my firm's present stock of postcard boards is exhausted, no other "Address Side" will be printed by us (unless specially ordered) bearing any phrase except that of "Printed Paper," and this at the top left-hand corner of the front, together with our usual trade mark.

There is nothing (the other conditions being conformed with) to prevent the public crossing off the phrase "Post Card" and re-writing in printed characters or bold writing the phrase "Printed Paper" to the left at the top.

Harold Hood.

Middlesbrough, October 8, 1918.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

X.—(1) We have no idea. (2) We think there is no restriction in your case. (3) About 15 per cent. (4) Reasonable.

G. J.—The Glossoid Co., 8, Mason's Avenue, E.C.2, will supply you; also the Indestructible Photo Co., 59, West Ham Lane, Stratford.

M. G. Kavanagh.—We have had no article on this branch of work, success in which is chiefly a knowledge of the points of the animals. Study of the reproductions in the farming papers would help you.

E. P.—We have heard of several similar cases with self-toning papers lately, so that it is evidently something to do with the preparation of the cards, probably the paper base. We advise you to write to the makers about it.

Direct Positives.—Will you kindly tell me how to get a positive through the camera instead of a negative?—H. C.

The only practical way is to use a collodion emulsion upon a dark card or ferrotype base. Fallowfield used to sell such cards, but we do not know if they can still be had.

C. A. W.—1. You must go to an optician, such as Ross, Dallmeyer, or Beck, and see what they can supply. Shutters are rare now. 2. We cannot say without seeing the lens and shutter. 3. The latter, certainly, if of suitable focal length for your work. 4. If the war continues, yes. 5. They are for studio work and stand cameras only. They are not at all expensive.

Repairing Shutter Blind.—I have a focal plane shutter which has recently developed a number of pin-holes. Will you kindly tell me how best to treat it?—W. L.

Mix some lamp black with ordinary rubber solution and rub into the holes. Allow it to dry thoroughly before winding up. Dust with French chalk to prevent sticking.

V. N.—If you mean accompanying a traveller from Switzerland to England, there would be no prohibition or duty, but we cannot say the same in reference to a camera sent in the ordinary way. We are rather under the impression that the import of such goods into England is forbidden at the present time, except under licence of the War Trade Department, 4, Central Buildings, Westminster, S.W.

G. P.—You can take perfectly good portraits by flashlight and you do not need a large lamp; in fact, no lamp is necessary, a tin dish and a piece of touch-paper (the latter being supplied with flash-powder) being all you require. Johnson and Sons, Cross Street, Finsbury, E.C., or Griffins, Kemble Street, Kingsway, both sell good powders, and give ample instructions for use. Only as much powder as can be used up in a week or so should be mixed at one time, since it loses its power by keeping in a mixed condition. It must also be borne in mind that it is explosive.

P. H.—1. We are afraid you would find that the exposures required with the enlarger you mention would be too long for professional work, except for very thin negatives. A condenser lantern would certainly be preferable, and an inverted gas mantle would probably be the best illuminant. Arc lamps are troublesome and needlessly powerful, and filament lamps, except half-watts, are not very satisfactory. 2. Have you tried ordinary water-varnish made with shellac and borax for glazing the cards? They simply require draining well from the washing water, dipping into the varnish and then drying.

B. H.—You ought to get a good price for the 4B Dallmeyer, although the most popular lens of this series is the 3B. It is not possible to say what is the current value, as we do not know whether it is of the latest type with the outside adjustment for combination of focus. If it is this latter, we should say the lens is worth about £25, but not as much if it is of an older pattern. Of course, you will get more by selling it direct to a buyer from an advertisement in our pages. If you do advertise, on no account send the lens to anybody until the purchase money has been deposited with our publishers.

P. W.—The best reflecting surface is one which is also a diffusing surface, namely matt paper or card. You are certain to be more liable to patchy illumination if you use a glossy surface. There is no particular advantage in having the reflecting surface an ellipse. If you make it big enough and a sufficient distance from the lamps, a flat surface is as good as any other and there is no necessity to interpose ground glass between the negative and the back reflector. The essential feature of the apparatus you intend to make is to have plenty of light-power, but we should think you would find that two 1,000 c.p. half-watts would be ample.

Enlarging Roll-Films.—(1) Having to enlarge from some roll-films with an ordinary artificial (condenser) enlarger, I should be glad if you could suggest the best illuminant, electric. My difficulty will be, I imagine, the heat on the film, and as they are valuable negatives I don't want to run any undue risks, as they cannot be taken again. I may say I have only electric light at my disposal. (2) Also, could you tell me if it is possible to extract the silver from the silver sulphide deposited from hypo. without having to send to a refiner. Is it possible to do in small quantities at home?—Silver, W. N.

1. If you sandwich the films between two glass plates and enlarge in the ordinary way, you will not find that any damage is done to the negatives. We have done this hundreds of times, using a small enclosed Westminster arc in the lantern. 2. It is not desirable to attempt to reduce silver sulphide at home unless you have a good furnace either for gas or coke. If you are unaccustomed to the work you will probably waste the lot.

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SUMMARY

Some practical notes on the difficulties which arise when copying difficult originals, such as surface colour and reflections, exposure, and granularity of the image, form the subject of an article on page 478.

The scientific exhibits at the Royal Photographic Society, which are fairly well representative in all fields despite war conditions, are reviewed on page 479.

An improved contribution to our knowledge of the behaviour of gelatine, particularly in films upon rigid supports, will be found in a communication from the Eastman Research Laboratory, the authors being Messrs. S. E. Sheppard and F. A. Elliott. (P. 484.)

The well-known Farmer's reducer is frequently made up in a very haphazard manner The disadvantages of such a course are pointed out on page 477.

An explanation of some causes of uneven colouring in bromide prints toned by the sulphite process is offered on page 477.

A new Order prohibiting the unauthorised use of cameras upon sea going vessels has been issued by the Admiralty. (P. 434.)

The alteration in *f*. values when copying on an equal or enlarged scale is frequently overlooked, and a warning against such omission is given on page 478.

The prevailing epidemic of influenza has claimed a victim in the person of Mr. A. W. Penrose, who died on October 19. Mr. Penrose's name was well known to all photographers, especially process workers, and his passing means a real loss to the country at a time when men of his type are urgently needed. (P. 434.)

A useful reflector for the retouching desk, and a paragraph on the behaviour of various types of lens when used on artificial-light enlargers, will be found in "Assistants' Notes." (P. 486.)

A criticism of a recent article on finding outdoor lighting and the reply to the author thereto, also a letter on metol and amidol poisoning appears in the Correspondence column. (P. 487.)

An appeal for old negatives, too small to be returned to the platemakers is made by the Ministry of Munitions. This glass is required for making eyepieces for gas masks; particulars will be found on page 486.

A question of interest to photographers was raised at the Preston Borough Tribunal as to whether skilled men joining up could ensure drafting to a photographic unit if they desired. (P. 486.)

A novel machine for developing rolls of film or bromide paper, in which fresh developer from a closed vessel is supplied to the surface by means of a roller and tongue is described in Patent News on page 486

EX CATHEDRA.

Uneven Tones. It sometimes occurs that sulphide-toned bromides show uneven patches, the brown being yellowish in one place and almost purple in another. This may be due to more than one cause. It may be uneven washing after fixing, whereby the deposit is locally reduced while bleaching, or it may arise from uneven action in the sulphide bath. It is well known that a weak or exhausted sulphide solution will not yield rich tones, and it is also agreed that if a print is so toned it is useless to attempt to improve it by immersion in a stronger solution. These facts will explain why certain enlargements which were recently shown to us showed the defect to which we have referred. Starting as good black and white prints they were bleached and washed as usual. They were taken out of the washing water without draining and dumped quickly into a small quantity of sulphide solution, one print being laid upon another in quick succession. When the last print was in, the operator began to shift them over, and then it was seen that parts were fully toned while others had barely started; as these were exposed to the action of the sulphide they continued to tone, but never reached the same colour as the rest of the print. The reason for this is obvious. The toning started with a sufficiently strong solution, but as more prints were immersed the solution became diluted, in addition to its being exhausted by its action on the silver. It may be worth noting in this connection that with poor flat prints the best colours can be obtained by using as strong a solution of sulphide as the paper will stand without blistering; the action is very rapid, and the prints should not be left in it a moment longer than is necessary.

* * *

Ferricyanide Reducer. Although this valuable solution has been known for nearly a generation, some operators still find difficulties attending its use. One of the commonest is the appearance of yellow stains which obstinately refuse to disappear, even with prolonged washing. There is often a general yellowing of the film which is rather persistent, but it will usually yield to sufficient treatment with running water; what is meant is that portions of the image which are to be altogether removed, as in the case of faulty margins of bromide prints turning to a light orange colour which remains. This we have found to be due almost invariably to weakness of the hypo solution. Many workers take a little of the ordinary fixing bath, dilute it with from four to ten times its volume of water, and then add a fairly large quantity of ferricyanide solution. Our own practice is to use a 15 per cent. solution of hypo, and to add to that such proportion of ferricyanide as may be needed, this proportion having a very great effect upon the action of the reducer. . With sufficient to give a very pale yellow colour, the reduction is even and does not clear away shadow detail before there is any appreciable action on the high lights, while with stronger solutions the reverse is the case. It must be remembered that the mixed solution is quickly decomposed by bright light, and that the dish must be kept in motion or uneven markings will result. Fresh plain hypo solution, without any admixture of bisulphite or any other acid ingredient, must be used. Many failures are due to the use of old fixing baths.

* * *

Focal Length and Stop Values. Many photographers do not pay sufficient attention to the altered stop values of their lenses, when the latter are being used for copying or other work at considerably more than their ordinary focal length. Neglect of this is more general when a complete lens is being used, than when the single components of an R.R., or convertible anastigmat is employed; in the latter case the operator knows, and allows for the longer focus and the smaller stop value. Recently, we met a photographer who complained that through some unexplained cause his R.R. lens, which gave first-class results at its marked focus, always produced harsh and inferior results when used for copying. Upon examination of the negatives, we noticed what looked like under-exposure; but this the operator said was impossible, as he had very carefully timed his exposures with the meter. Subsequent discussion showed that he had entirely overlooked the fact that though his lens was marked *f*/8 at its normal focal length, when copying it was used at a much longer camera extension, and was in reality *f*/16. In ordinary work a few inches would not make much difference in the stop value, but when the instrument was used for copying, as in the present instance, the value of the stops had been completely changed, with the under-exposed results described, for which the lens was blamed. Photographers, in common with many other people, often blame their instruments without looking into the subject to find the real reason for defective work.

* * *

The Feet in Portraiture. One of the greatest difficulties that the photographer encounters in the portraiture of full-length figures is to give a satisfactory rendering of the feet. For this reason, perhaps, the three-quarter length figure is so popular, and is regarded by many operators as a solution of the problem, until there comes a day when some sitter requires a full-length portrait of himself. With feminine sitters the feet do not seem to be nearly so troublesome as is the case with men. The main difficulty—i.e., stiffness, may be overcome by simply posing the sitter easily and covering the awkwardness of the feet with graceful folds of the dress. As a general rule the most successful full-length portraits are standing figures, as when sitting there is a tendency on the part of the model to sit stiffly with the feet close together. Much may be done by placing one foot a few inches in advance of the other or even by turning it slightly sideways. With male sitters' crossing the legs, if a characteristic attitude of the individual, may tend towards eliminating stiffness. It is sometimes possible to swing the back of the camera, thus throwing the feet very slightly out of focus and suppressing them as far as may be, and another good plan is to reduce the lighting in this particular quarter. At times highly-polished boots will emphasise the ugliness of particularly ugly feet and threaten to strike an unpleasant note in the portrait. This may be explained to the sitter who allowed the superfluous "shine" to be dulled with a slightly damp cloth. In the case of a standing or leaning figure an accessory, such as a chair or rustic seat, may be employed to hide the feet if there is any tendency towards awkwardness. Many a photographer's show-case could give abundant examples of neglect in posing the feet, which a little attention would have remedied, and this may be said to be one of the little things which have a very real bearing upon pleasing results.

PITFALLS IN COPYING.

No branch of photographic work calls for a sounder knowledge of the art than the copying of photographs, documents, pictures, and the like, and this is more especially the case when the work has to be done with such appliances as are usually found in an ordinary studio. As a rule the quality of the work so done is poor, although the operator himself does not realise it. Copying is to him an abomination, and he does not start on a job with the idea that he is going to get a first-rate result.

There are many points to be observed if the best possible result is aimed at, one of the most difficult problems being properly to estimate the actinic values of the image and its support respectively. If we take an old albumenised print made forty or fifty years ago, we shall probably find that it consists of a purplish image upon a yellow ground, varying from a deep cream to a full cheese colour. Here the temptation is to under-expose, through fear of over-exposing the image, but it must be allowed that, no matter what happens, sufficient exposure must be given to allow the high-lights of the subject to develop up to a reasonable density. With experience it is possible to estimate exposures of such subjects with great accuracy, but the inexperienced copyist will do well to sacrifice a small plate in making a strip test, as is usually done in bromide printing. If only a quarter-plate be used upon a portion of a 12 x 10 subject it will suffice, four exposures of an inch wide may be made, and ratios of one, two, four, and eight times given. For the benefit of those not accustomed to strip exposures we may say that the best method is not to pull out the slide one inch at a time, but to open it fully and to push it in step by step. Thus, supposing that the shortest exposure likely to be of any use is estimated at ten seconds, we open the slide fully and give this exposure; then we cap the lens, push in the shutter so that one inch of the plate is covered (this may be arranged for any size of plate by making pencil lines upon the inner surface of the shutter), and giving a second exposure of ten seconds; successive exposures of twenty and forty seconds are made in the same way, great care being taken not to disturb the camera. We have now exposures of ten, twenty, forty, and eighty seconds upon the same plate, and these should be fully developed, no notice being taken of the appearance of the image until it is fixed. It will now be easy to deduce the proper exposure from the appearance of one or other of the sections. It may be that the strip with twenty seconds is a little too thin, and that with forty too dense; hence we should say that thirty seconds will give the best result. Or even the ten-second one may be too dense, or the eighty-second one too thin; in these cases the appearance of the image should give sufficient indication as to the reduction or increase of exposure which will be necessary.

Another point on which sufficient care is not exercised is the illumination of the surface. Many photographers think that it is only necessary to avoid reflections from the surface of glossy prints and glass-covered pictures, but this is not the case. Any gelatine coated paper has sufficient surface reflection to degrade the shadows if improperly lighted, and it may here be said that much may be done to cut out these surface reflections by using a colour-sensitive plate and a yellow screen, even if the nature of the subject does not seem to call for it. By reducing the effect of the surface-reflections the yellow screen also helps to remove the great bogey of the copying "grain." Most copies show a great deal more of the texture of the original paper than was apparent to the eye, and this can only be overcome by proper lighting. The process engraver has an ideal method of illuminating his originals by using two arc lamps, one on either side of the original, and by this means he eliminates the little shadows which are the cause of the trouble. It is a curious fact that many copies are spoilt by "grain" through the use of a large camera and a short-focus lens. The effect of these is to cut off nearly all the front light which would fall upon the original, and to leave only side light to do the work. It is a good exercise to take a print on lingrain paper and to make a negative in which the grain is hardly visible. There is one kind of grain which cannot be eliminated, viz., that caused by fine cracks in the albumen surface which have got filled in with dirt. All that can be done with these is to copy with a soft-focus lens or to interpose a thickness or two of thin celluloid between the negative and paper when printing.

The development of copy negatives requires to be done rather differently from ordinary direct portrait work. With a copy the image appears practically even all over the plate at the start, and not in stages, as in portraits, where the white collar, the face and hands, and the clothing, appear at appreciable intervals after each other. With a copy of the same subject the image would come up on a level, and the operator is apt to think that the plate is over-exposed, and to commit the error of stopping before proper density is obtained. This appearance is due to the slight surface-reflections we have already mentioned. In the original the black shadows of the coat are representations of black cloth on which no light is falling, in the copy they are representations of a piece of paper covered with a layer of dark silver particles, the surfaces of which receive exactly as much light as the high-lights of the picture. Therefore we must take care to give as nearly as possible the correct exposure, and then to develop fully, so as to secure sufficient contrast and avoid the flatness to which the superficial nature of the original would naturally tend.

The choice of a plate for copying is an important question. Some operators assert that they can make as good copies on their regular portrait plates as upon any other. This may be so with certain subjects, but with badly faded originals a variety of speed and quality is essential. Although it may seem paradoxical, the best results from very flat and faded originals can often be obtained upon "process" plates in spite of the yellowness of the ground, and such plates should always be used for line subjects, letters, and the like. Ortho plates with a yellow filter are absolutely necessary for most coloured subjects. A plate which does not give density readily is not usually much good for this class of work, therefore "ordinary" plates are always to be preferred to more rapid grades. There is no disadvantage in using an orthochromatic plate for any class of work, even without a screen. There will be practically no difference in the colour rendering unless a screen be used, so that there is no necessity to stock ordinary and "ortho" plates of the same speed.

A last note of advice we would give the beginner in copying is not to try experiments on a rush job, but to work at leisure when a failure can be investigated, and a second trial made without delaying the execution of the order.

THE EXHIBITION OF THE ROYAL PHOTOGRAPHIC SOCIETY.

SCIENTIFIC AND TECHNICAL EXHIBITS.

With the restriction of intercourse between workers in different countries, and as a result of the diversion of many scientific workers to problems connected with the war, it is not a matter of surprise that the scientific and technical exhibits are this year fewer in number than ordinarily. Nevertheless they embrace work done in the application of the camera in the accustomed fields of natural history, astronomy, meteorology, etc.

Colour Prints and Transparencies.

Colour photography on paper is represented by only three prints, of which the most interesting is a little copy of a painting by Frank Brangwyn (No. 125) by John Bean, a little bit of fine technique and reflecting credit upon the Raydex process. There is one Bromoil transfer in colour (No. 124) by Fred Judge, which perhaps is not quite equal in quality to those of his we have seen at previous exhibitions. A large colour print (No. 123) by A. Motteau, apparently is some form of oil print, certainly a strong piece of colour work though how much if it is adventitious it is impossible to say.

Among the colour transparencies a medal is awarded to "Blackberries" (No. 172), by H. Essenhigh Corke, an extremely fine piece of work in its rendering of both colour and texture. Louis J. Steele is again an exhibitor of Autochrome nude studies, for one of which, "In the Forest" (No. 180), he receives a medal. The technical difficulties of the subject have apparently prompted this award. Artistically and even technically the same worker's "Water Lily" (No. 181) and "Autumn Leaves" (No. 183) have more quality in them than the medalled transparency. The artistic aim in Autochrome is well represented by J. C. Warburg's transparencies, of which the most successful are Nos 199 and 200. For technical quality it is hard to find anything better than, or even as good as, the "Portrait" (No. 226) by N. E. Luboshez, one of the very few portrait Autochromes we have ever seen which leaves nothing to be desired in its rendering of flesh tones. The Paget process is represented by eight examples by Miss Florence Henderson (Nos. 189 to 196), all very nice renderings of pictorial subjects.

Although not an example of colour photography, reference may be made here to the study in colour values (No. 297) by J. McIntosh. It is a photograph of a vase of flowers taken on the new Ilford panchromatic plate without a light-filter and, by reference to the description in the catalogue, sufficiently indicates the remarkable colour-sensitive properties of these plates.

Natural History and Photomicrography.

The nature photographers make a comparatively poor show this year, and indeed in these great days of history it can be understood that even another negative of the great crested grebe seems less an incentive than in ordinary times. No. 236 is a strikingly fine photograph of a pelican by G. B. Clifton, in its tonal qualities a perfect piece of straight photography, and evidence that in his pictorial essays as a super-controllist in Bromoil Mr. Clifton is unfortunately divorcing himself from his powers as a photographer pure and simple. Other fine work is Walter Selfe's "Brown Bear" (No. 237), Hugh M. Bell's "Head of Malay Tigress" (No. 240), and A. S. Clark's "Pelican" (No. 247). In this section it is gratifying to find a contribution of further educative exhibits of the life-history of insects by Hugh Main, Nos. 298 to 301 representing stages in the development of the stag beetle, the bot fly, and the rat-tailed maggot.

Photo-micrography is this year a strong section containing examples of the fine work of Ernest A. Pinchin, G. Ardaseer, and Dr. G. H. Rodman. Dr. Rodman has an interesting set illustrating the destructive effects of X-rays upon a hairy skin. J. H. Pledge shows a series of photo-micrographs of the proboscis of the blow-fly; but technically perhaps the finest work in this section is the series Nos. 304 to 315, by J. G. Bradbury.

X-Ray Photography.

Methods of radiography do not secure a representation on the walls of the exhibition commensurate with the work which is being done in the diagnosis and treatment of wounded. Evidently we must wait until the end of the war for a demonstration of the immense value of X-rays and of the means taken to apply them upon the battlefield. A medal is awarded to Dr. Robert Knox for a single-flash radiograph of the chest (No. 260), a piece of work which eloquently marks the immense progress which has been made in the way of rapidly radiographing thick parts of the body. In the rear portion of the Society's library on the ground floor will be found a most interesting collection of exhibits by N. E. Luboshez illustrating the making of X-ray negatives on films. Mr. Luboshez has done a good deal more than demonstrate the benefits in the way of lightness, etc., in using films. The exhibits show the remarkable renderings obtained by exposing several superimposed films in making the exposure coupled with appropriate development of the separate films. It would seem that in this use of several films he has accomplished something comparable with the employment of a double-coated plate in ordinary photography, but obviously the facility of treating the films differently in development confers advantages which must be of particular value to the radiographer, whose subjects often compass extremes of density. Mr. Luboshez has struck out into a new and much neglected field, for great as have been the improvement in apparatus for the making of X-ray exposures, experiment and investigation of the photographic part of the process have hitherto lagged behind, with the result that in many X-ray establishments the development of the exposures is often conducted in a very desultory manner.

Astronomy and Meteorology.

The astronomical exhibits are few and are chiefly concerned with photographs and spectro-photographs of the new star, Nova Aquilæ III. The Solar Physics Laboratory shows spectrum photographs taken with the Huggins telescope and prismatic slit-spectrograph (Nos. 126-127). Other photographs are those by the Astronomer Royal, Greenwich (Nos. 134-6), whilst progressive spectra shown in comparison with those of Nova Persei made in 1901 are shown by Father A. L. Cortie, of Stonyhurst. A medal is awarded to Professors A. Fowler and R. J. Strutt for photographs (292) illustrating laboratory experiments on the ultra-violet absorption of ozone and proving the presence in the spectra of Sirius and the sun of bands produced by the ozone in the earth's atmosphere.

Four prints of cloud types represent the very exhaustive work in this application of photography to meteorology carried out by Auborne Clarke, of King's College Observatory, Aberdeen.

War Photographs.

In the library on the ground floor is arranged a collection of enlargements lent by the Ministry of Information and representing scenes of comparatively recent date upon the western front. These include one or two aerial photographs and generally give some vivid glimpses of operations in France such as have been the subject of the various war-photograph exhibitions.

Trade Exhibits.

Exhibits by a few manufacturing firms are arranged in the vestibule. Messrs. Kodak, Ltd., show specimens by the Kodak "transferotype" stripping bromide paper chiefly in the way of producing artistic effects by transfer of the finished print to fresh paper supports. Examples of prints on their bromide paper are shown by Messrs. Thomas Illingworth and Co., the raw paper base being baryta-coated in their own factories. Much artistic work in Autotype carbon is shown by the Autotype Company, whilst Messrs. John J. Griffin and Sons, Ltd., exhibit prints on their gaslight and bromide papers.

THE RETICULATION OF GELATINE.

[A Communication from the Research Laboratory of the Eastman Kodak Company.]

The reticulation of the surface of negatives is often a source of trouble to photographic workers. This trouble is most likely to occur in hot weather, and is generally produced after fixation either during or just subsequent to washing. The wet gelatine layer becomes more or less finely wrinkled or corrugated, the network of puckers forming a pattern generally extending over the whole of the negative, but sometimes only over part of it.

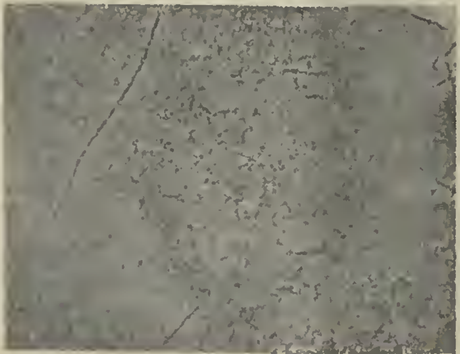

Fig. 1.

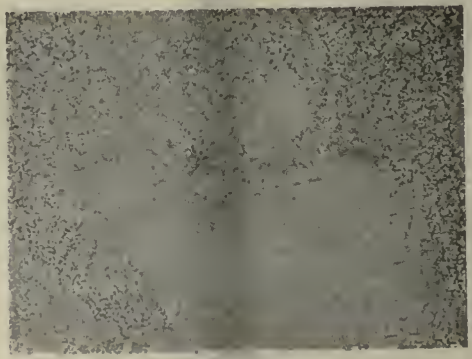

Fig. 2.

As will be seen from the illustrations (Figs. 1, 2, 3), the "grain" of the network may vary considerably from very coarse dimensions down to very fine and even microscopic dimensions. This reticulation persists with only slight modification after drying. At the same time, as will be seen from the figures, if it occurs on a developed plate, the silver deposit undergoes a redistribution along with the reticulation of the gelatine, accumulating in the raised portions and diminishing or vanishing in the valleys or troughs between.

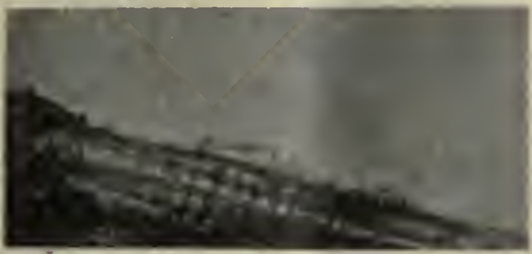

Fig. 3.

This reticulation has been utilised in some photo-mechanical processes; thus it is by the reticulation of gelatine that the "grain" of a collotype plate is produced. It has been employed in the production of irregularly grained "half-tone" screens, in which the reticulation pattern takes the place of the cross line rulings of the regular screens.

An understanding of the conditions affecting and determining reticulation will not only be of practical use, but will tend to throw light upon the physico-chemical nature of gelatine, and perhaps help towards the scientific specification of gelatine for photographic use.

The Swelling of Gelatine in Water and its Shrinkage on Drying.

The immediate cause and mechanism of reticulation will be best understood if we first consider a few facts on the normal swelling and shrinkage of photographic gelatine film which takes place in this treatment and use.

There are two aspects to this. In one we have only to consider change of mass or bulk; in the other change of shape. As to the first, any piece of gelatine, placed in water within a temperature range of roughly 0° to 20° C., swells at first rapidly, then more slowly, and finally reaches a limit. Fig. 4 shows the curve of this swelling, plotted against the time.

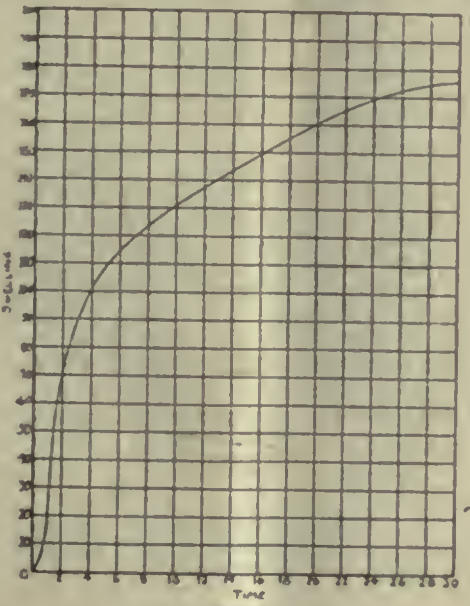

Fig. 4.

The limit attained not only depends upon the temperature, but also upon the character of the gelatine, and, to a very marked extent, upon the presence of foreign substances, especially electrolytes, in the water. Acid and alkali in particular have a very great influence upon the swelling, as will be seen from the curve (Fig. 5), which shows results actually obtained with a sample of gelatine.

In this curve the ordinates give the amount of water absorbed by 1 gram air-dry gelatine on final swelling (about forty-eight hours), while the abscissæ give concentrations of acid and alkali in normality. As is evident, the swelling or absorption of water is extremely sensitive to both acid and alkali or, in terms of the ionic theory, to hydrogen and hydrozyl ions. In fact, the actual sensibility is of the same order as that of the dyes used as analytical indicators. The minimum absorption probably lies in reality at a point represented by the dissociation of pure water, according to the equilibrium.

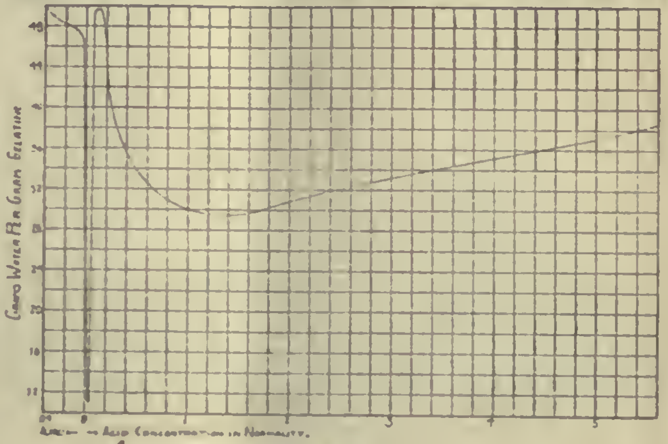

Fig. 5.

$$H^+ + OH = H_2O$$

but this is masked usually by residual acidity or alkalinity of the gelatine. The precise determination of this point for a given gelatine will probably prove of some importance in the specification of photographic gelatines. It is of great interest, since in passing from an alkaline to an acid state the swelling goes through a very pronounced minimum.

The influence of neutral salts in solution upon swelling is too complex to be discussed fully. It will be sufficient to note that some, such as iodides, act in the direction of increasing the swelling (hydration) others, as sulphates, in the sense of diminishing it. So long as only salts of the alkali, metals and ammonia, are considered, it is the acid part or union which is of chief importance, and these salts have been arranged in a series indicating their effect upon swelling. The effect of a given salt depends much upon its concentration and, above all, on the acidity or alkalinity of the solution.

Now, turning to the influence of shape upon swelling (and conversely) we find here that a dominant factor is that of the condition in which the gelatine first swelled or was cast and dried. Gelatine, in the abstract, as a homogeneous material alike in all directions, should, theoretically, tend to swell or shrink uniformly without change of shape, only altering its mass or bulk. If gelatine could be dried very slowly so that the loss of moisture proceeded at the same rate in all parts of the mass, then it would shrink without change of shape, but such a condition cannot be realised in practice, and gelatine dries more rapidly on the surface than in the interior, thus producing stresses and distortion. In the case particularly important to us the gelatine is coated on glass or film support and firmly attached to it, so that one side is eliminated as regards drying, etc. The gelatine cannot spread off the plate, so that its swelling and shrinkage are limited to one direction—viz., that perpendicular to the plane of the support (cf. Fig. 6). This state of affairs is determined in advance by the first drying down of the jelly (or emulsion) on the support; it is not peculiar to the photographic film, since ordinary sheet or leaf gelatine which has been dried on nets shows the same tendency to have its principal expansion perpendicular to the face of the sheet.

The Production of Reticulation.

A gelatine film, under normal conditions, can be repeatedly swollen and dried without losing its capacity to swell and shrink normally to the plate. It is evident that a certain strain must be imposed upon the gelatine in drying, which is removed by swelling. If we consider an ideal unit cube of the swelling gelatine, supposed free from all constraint, it would tend to expand uniformly in all directions. This ideal uniform expansion corresponds to a uniform swelling pressure, i.e., a pressure the same in all directions. We can consider this resolved into forces perpendicular to the surface, and forces parallel to the surface. Actually, the gelatine layer in sheets or in plates does not swell uniformly. The forces parallel to the surface—which would, of course, tend to remove the film from the glass or support—must be compensated. This compensation is in a measure external or initially external, being due to the adhesion of the gelatine to a rigid support, but it is chiefly internal, arising from a uniform strain or tension impressed by the mode of drying.

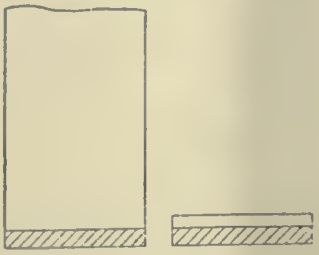

Fig. 6.

Now suppose the gelatine layer be subjected to drastic internal action, excessive swelling, and excessive dehydration, either successively, or in a measure, simultaneously, then gelatine jelly will be strained beyond its elastic limit, showing either a total or a partial reaction.

Total reaction would imply the detachment of the layer from its support, a result which is seen in frilling and floating off as a result of excessive lateral expansion.

If, however, the adhesion to the support is maintained, but the newly disengaged tangential or lateral forces are not entirely compensated, then the strain distribution in the gelatine layer ceases to be uniform and we get a local puckering or folding similar in character to that produced in the earth's surface by tangential forces acting on restricted areas of semi-liquid igneous rocks.

Thus the immediate mechanism of reticulation is the production of restricted tangential dilation, which is partially arrested.

This, however, leaves unsettled the inner physical chemistry of the process, that is, the origin of an excess swelling pressure (the superpressure) and of a partial or localised arrest of this. This can be discussed best in dealing with specific cases of the production of reticulation.

Experimental Production of Reticulation.

A typical case, which has the advantage of following ordinary photographic procedure, is as follows:—A Seed 23 plate is "flashed," developed in a standard pyro-soda developer for four minutes at 80° F., then rinsed and fixed in a standard hypo-bisulphite fixing-bath at 80° F. Reticulation was then found to depend upon the temperature of the wash water as follows:—

Temperature.	Reticulation.
70° F.	None
80° F.	None
90° F.	Faint
100° F.	Strong

Instead of water, stronger and more definite results were obtained by an after treatment with the following solution:—

50 c.c.s.	95% ethyl alcohol
40 c.c.s.	5% formaldehyde
110 c.c.s.	Water

In this case the following factors may have played a part:—

(1) Pre-hardened gelatine in the emulsion.

(2) Tanning agents produced in development.

(3) Excess swelling, pressure in hot developer, etc., and particularly in washing.

That reticulation can be produced by the combined action of both a swelling or softening agent, and a hardening or anti-swelling agent to restrain this, is shown by the production of reticulation by the following combinations:—

No.	Hardening Agent.	Softening Agent.
1.	Tannic acid	Acetic acid
2.	Quinone	Acetic acid
3.	Chromic acid	Hot water
4.	Mercuric iodide	Potassium iodide

All of these combinations produce reticulation, but (1) and (2) have only a theoretical interest, as they are difficult to control. The other two pairs are more susceptible of control; although it must be emphasised that in any case the balance between hardening and softening agents must be delicately adjusted, and that the measure of control is limited. Further, the occurrence or production of reticulation is in a very large degree dependent upon the nature of the gelatine. The so-called "hard" gelatines tend readily to reticulation, while the "soft" ones only give transient signs of it.

An experiment on this point gave the following results:—

Gelatine.	Coating.	Reticulation in potassium mercuric iodide.
A Hard	8%	Strong, permanent
B Hard	8%	Strong
C Soft	8%	Very faint trans.
D Soft	8%	Same
E Soft	8%	Same

The following results were obtained with combinations of softening and hardening agents (3) and (4).

Chromic Acid and Hot Water.

Chromic acid is of course a well-known hardening agent for biological tissues. Working with 8 per cent. hard gelatine machine-coated on glass, a 10 per cent. solution of chromic acid at 20-22° C., followed by washing with water at 56° C., were found to afford the best conditions.

Potassium Mercuric Iodide.

The solution of mercuric iodide in potassium iodide known as Brücke's reagent was found to be a convenient strength for use. According to the formula for this, 120 gms. of mercuric iodide are to be dissolved in a solution of 50 gms. potassium iodide in 500 c.c.s. water and the whole diluted to 1,000 c.c.s. We found, however, that under these circumstances only about 72.6 gms. of mercuric iodide could be dissolved at room temperature, nor was this result much affected by heating to 50° C. It should be noticed that these quantities are near to those necessary for the double salt $2KIHgI_2$ or K_2HgI_4. In this combination the softening agent is the iodide, or more specifically the iodion I, while the hardening or coagulating agent is the mercuric salt, or, again, the mercuric ion $Hg{+}{+}$. Attempts made to increase the proportion of mercury were without success. A saturated solution of potassium iodide at 18-20° C. was made containing 128 gms. potassium iodide to 100 c.c.s of water, or 56.2 gms. in 100 gms. solution, which agrees fairly with the value, 59 per cent. at 20° C. given as the solubility in Landolt-Börstein. This solution was saturated at 20° C. with mercuric iodide, taking up 64 gms. In this the ratio of 2KI to HgI_2 is 0.69, whereas the actual double salt would call for 0.73. This solution was used as a saturated stock solution, and Brücke's reagent is equivalent to 10 parts stock saturated plus 90 parts water.

Working with the 10 per cent. saturated (= Brücke's reagent) and hard gelatine 8 per cent. machine-coated, the following results were obtained:—

Duration of treatment.	Effect.
2¾ minutes	Small pock marks about 1 mm. apart, produced in 40 seconds, followed by reticulation which was much lessened in drying.
3½ minutes	As before, but reticulation somewhat more persistent on drying.
5 minutes	As before, but with continued treatment reticulation became fainter and vanished on drying.
10 minutes	As before, but the whole surface finally softened and could not be dried, softening and running.
10 minutes	After treatment this was chilled 15 minutes on ice, then immersed for two minutes in 3% formaldehyde, this conserved the reticulation.

The formaldehyde after-treatment seems generally necessary with this agent to "fix" the reticulation. Using soft gelatine, 6 per cent. solution machine-coated, and a wide range of concentration of the potassium mercuric iodide solutions, only slight and transitory reticulations were observed in the higher concentrations, giving way, however, to a general softening and liquefaction. Attempts to overcome this by preliminary hardening with formaldehyde were not successful. Pre-hardening with chrome alum showed better results. In the case of the mercury potassium iodide combination, while it is not possible to increase the mercuric iodide ratio above a certain limit, other permanent or temporary hardeners may be added. In particular it was found that Brücke's reagent with the addition of 6 per cent of saturated Na_2SO_4 solution gave very fine, uniform reticulation.

Sodium sulphate used in the reticulating process makes the "grain" finer, while after treatment with formaldehyde increases or conserves the depth of the wrinkles.

An important conclusion from these experiments is that apparently reticulation may start in more than one way. Thus with the Brücke's reagent, and with chromic acid followed by hot water, reticulation proper was generally proceeded by the appearance of small pock-like markings of about 0.2 to 0.3 mm. diameter. These would sometimes align themselves in "streaks," and in any case seemed the foci of the subsequent reticulation. These markings are shown in Fig. 7 On the other hand, in the reticulation produced by the use of hot water after development and fixation these initial markings did not appear.

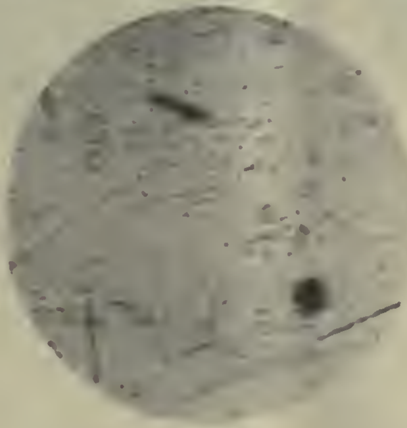

Fig. 7.

Effect on the Silver Image.

It is noteworthy that when the reticulating film contains developed silver particles—as in negatives after fixation—there is an apparent migration of the silver particles, the ridges being denser, the valleys much less dense or even quite clear.

The question arises whether reticulation is simply a puckering of a sheet grown larger by lateral dilation, larger than the support boundaries, but retained on this by local adhesion, particularly at the edges, as is indicated in Fig. 8, or is a mosaic-like alternation of hardening and softening effects, the ridges being more swollen, the valleys more tanned, as suggested by Fig. 9.

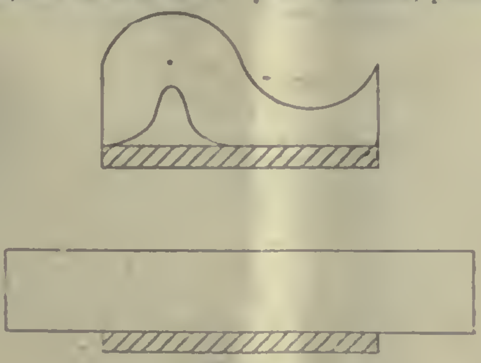

Fig. 8.

It is evident that in the first case the excess in the ridges is simply due to the total thinning (by the lateral dilation), plus local thickening due to folding of the increasing sheet. In the other case the greater density in the ridges would be due to an actual migration of silver due to tension, similar to that occurring in the drying of moisture spots, when the tension in drying softens the gelatine and forces the particles into the periphery of the spot. This effect is shown in Fig 10, a drawing made by Mr. M. B. Hodgson from microscopical observations. In the latter case we should have in reticulation a great and increasing number of microscopic replicas of such "moisture spots," tending to run into each other and form one system, like cracks in a drying mass.

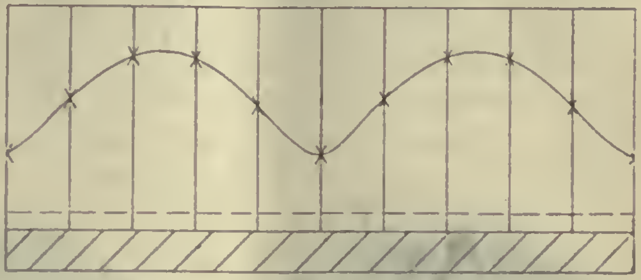

Fig. 9.

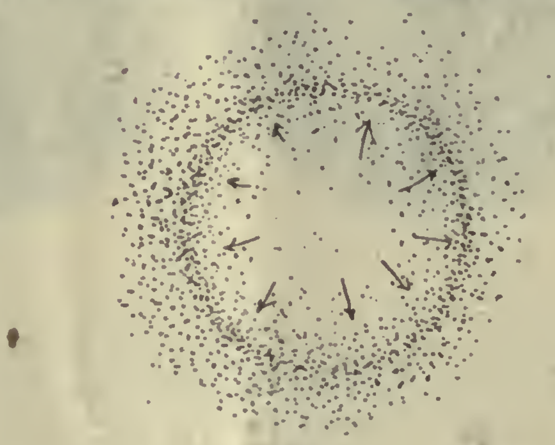

Fig. 10.

The theory of alternate softening and hardening, or of differential swelling, couples up readily with the fact already noticed that in many cases reticulation starts from a number of isolated points.

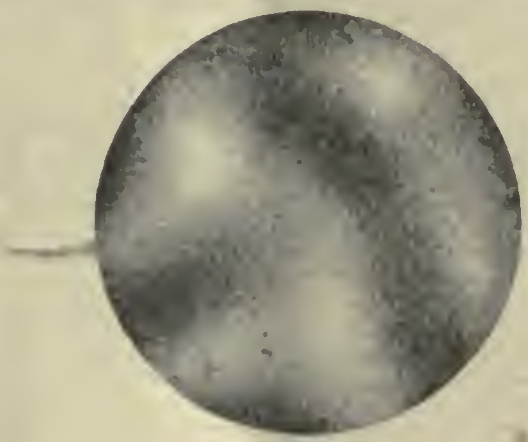

Fig. 10a.

When a combination of softening and tanning agents are present together in a gelatine gel, a certain amount of selective absorption and differential diffusion will occur. A molecule or ion having a tanning action will tend to be absorbed or fixed in situ, and its own specific diffusion will be hindered. Molecules or ions having a softening action may modify the action on tanning agents, but their own diffusion will be facilitated by their hydrating and softening action on the gelatine.

It is easy to see that we should have then a condition of rhythmic coagulation of the gelatine very similar to that shown to the well-known Liesegang rings. In this latter case, when two salts which react to form a precipitate are allowed to diffuse together through a gelatine gel, the precipitate, such as silver chromate or silver halide, is not deposited uniformly, but rhythmically, in alternate rings or layers.

Actually it is observed that reticulation generally starts in one or more regions and fills up by the spread of these; in some cases from isolated foci. It seems then that reticulation in its earliest stage involves something like the nucleation of a crystallising solution. In such a solution crystallisation may start either at nuclei already present in the solution or by the formation of new ones, but in the later case there is required a higher degree of super-saturation for crystallisation to start. At what points in such solution or melt the first nuclei appear is a matter of pure chance, and it is apparently much the same with the start of reticulation.

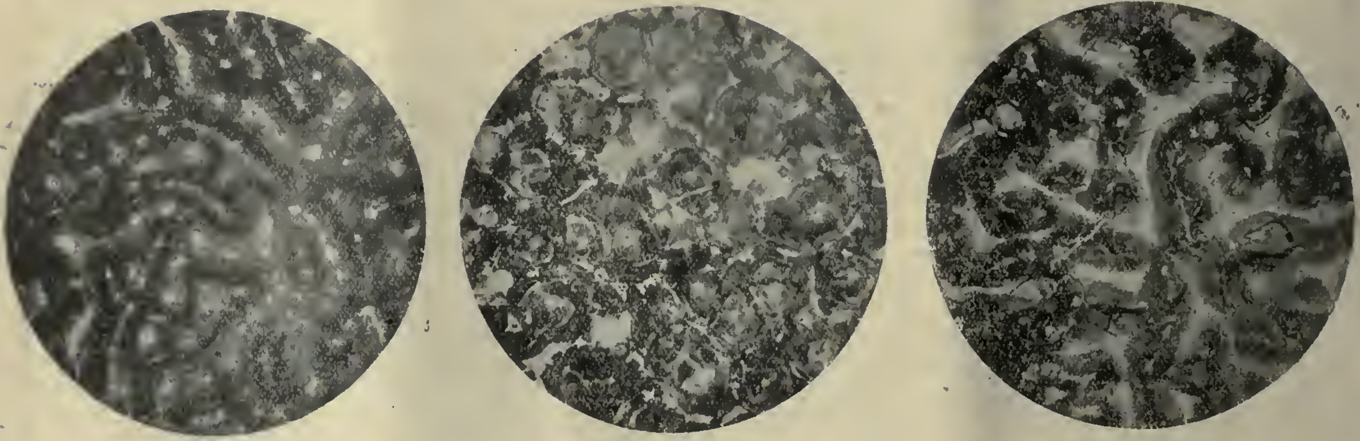

Fig. 11.

The Connection Between Reticulation and the "Graininess" of Negatives.

In one important case where it is very probable that incipient reticulation is at work foreign nuclei are available. This is in the case of the ordinary development of a photographic emulsion.

It is known that, apart from differences in emulsion, different developing agents and treatments affect the "graininess" of the developed image. By this it is not to be understood the elementary plate grain, but such clumping in second order aggregates as is liable to be objectionable in projection. This granulation depends upon development, and in the same way resolving power depends upon development and the developer. (Cf. K. Huse: Photographic Resolving Power, Journ. Amer. Optical Soc., I., p. 119, 1918.) It is hardly to be doubted that we have in this case a selective absorption and differential diffusion of development, producing what amounts to incipient reticulation, nuclei being formed by the developed silver particles, with their tendency to absorb the colloidal reaction products of development, which have tanning or coagulating properties. Consideration of the great change in the swelling equilibrium shown on passing from an alkaline to an acid condition (cf. Fig. 5) shows also that the operations subsequent to development are very liable to develop still further any sub-microscopic reticulation, and again to coarsen the "grain" of the image. It is hoped to follow this up experimentally when time permits, instruments having been devised for measuring both granularity and minute swellings.

In Fig 11 are given photomicrographs of some of the reticulated preparations described taken with vertical illumination at 100 diameters.

S. E. Sheppard.
F. A. Elliott.

No Photographing at Sea.—The Admiralty has issued an Order under the Defence of the Realm Regulations prohibiting the unauthorised use of cameras on board a British vessel at any time or on board a foreign-owned vessel while within the territorial waters of the United Kingdom. The master of a British ship is to take charge of all cameras in the vessel until the owners disembark; in the case of a foreign ship the cameras can be returned when the vessel leaves the territorial waters.

Belgian and Registration.—At the Brighton Borough Bench last week Aime Van der Bogaerds, 22, East Street, Shoreham, photographer, was summoned, as an alien, for failing to notify the Registration Officer of his change of address on or about August 24. He pleaded guilty. Defendant told the Bench he presented himself so frequently at the Aliens Registration Office at Brighton that he was told there not to come any more until he left definitely. He never changed his permanent address at Shoreham, and only came to Brighton occasionally. Mr. Jeffreys reported that defendant was summoned at Shoreham for an exactly similar offence on May 29, 1916, and fined 20s. Defendant was now fined 40s. or 11 days.

DEATH OF MR. A. W. PENROSE.

We regret to record the death of Mr. Andrew Wybrant Penrose, Governing Director of A. W. Penrose and Co., Ltd., of 109, Farringdon Road, E.C., the well-known photo-process supply firm, which he founded in partnership with Mr. William Gamble, F.R.P.S., in 1893. Mr. Penrose was originally a pharmaceutical chemist, and the present business grew from a very modest beginning with the supply of photographic chemicals until it has now become an extensive engineering and manufacturing business with world-wide connections. Mr. Penrose had been an invalid for several years, the strenuous work of the early days of the business having undermined his health. His end was hastened by an attack of influenza followed by pneumonia and he passed away at Hove, Brighton, on October 19. He was 58 years of age. He is survived by his second wife, and leaves an infant son.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

A Retouching-Desk Reflector.

A very serviceable reflector for the retouching desk, and one that will last indefinitely, can be constructed in the following manner, the necessary materials being four pieces of thin glass (old half or whole plates will do if obtainable), one piece of silver paper, three pieces of white paper, some passe-partout binding or substitute, a couple of feet of broad tape, and a little Seccotine.

The glasses are cleaned and polished—a few flaws or waves in the glass can be disregarded—and on the surface of one is laid the silver paper, which has previously had a squeeze in the dry mounter. If one sheet of sufficient size cannot be obtained, several small squares, such as are found in cigarette packets, will do, but they must be overlapped a little. The corners are secured to the glass by a mere trace of Seccotine, applied with a sharpened match, and over the silver foil is laid a piece of pure white paper, cut the same size as the glass. Over this, again, is laid a second glass, and the lot bound with strips round the four edges.

The third piece of paper is treated with the aerograph, and tinted lightly and evenly with Payne's grey; the other piece is tinted also, but darker. A tuft of cotton wool and some graphite powder will serve if no aerograph is available. The two papers—each the same size as the glasses—are placed together with the tinted sides out, and bound between the remaining glasses. When the binding is dry and set, the two double reflectors are placed side by side, and the tape is cut into two equal lengths, each of which will reach across both of the reflectors. The tapes are seccotined and attached, binder fashion, one to the top edges and one to the bottom edges of the reflectors, leaving a little play in the centre. When this is dry the result is a folding article capable of showing four different surfaces, and suitable for almost any negative in almost any light. The glass covers keep the papers clean, and with care the appliance should last for years.—Thermit.

The Lens for Enlarging.

In arranging an enlarging installation for regular use to replace contact printing there are several factors to be taken into consideration regarding the lens to be employed. The disadvantages of the condenser enlarger are always increased by a lens of small aperture, and that is why portrait lenses are often supplied for the purpose of giving a large and evenly illuminated disc of light on the easel. While such a lens will enlarge portraits satisfactorily, it needs considerable stopping down for covering a negative of a group or other subject in which detail is required to be sharply rendered all over. The illumination will then not compare with that given by an anastigmat which may not be of such large original aperture but which needs little if any stopping down to cover sharply.

There seems to be considerable difference in the behaviour of various types of lenses when used on an enlarger, and it is not advisable to choose one of too short a focus. An air-space lens has not the best of reputations for use outdoors owing to its liability to haze in the shadows of the subject, but one lens of this type which I hesitate to employ on a camera for this reason is splendid for enlarging, as it gives equally good definition all over the field with scarcely any stopping down, and it seems to behave better at the longer extensions used in copying and enlarging than it does in taking photographs.

When enlarging with an enclosed arc, however, an anastigmat is seldom found suitable, because of differences between the visual and chemical focus, however carefully this has been eliminated for normal camera use. An ordinary R.R. lens is usually found better for employment in combination with this illuminant.—B. D.

Royal Photographic Society Exhibition Lectures.—A slight variation in the programme of lectures is announced. The presidential address by Dr. C. Atkin Swan cannot be given on November 12, professional duties will require his attendance elsewhere, and the lecture will have to be postponed until January 21. In place of the address, a paper on "The Causes of Variation in the Watkins Factor for Different Developers," by James C. Kingdom, will be read.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Developing Apparatus.—No. 116,709. (June 6, 1917.) The apparatus comprises a light-tight chamber, a guide in the chamber and rollers for leading the photographic strip sensitised portion upwards in the guide through the chamber; a closed vessel containing developing agent and means for supplying a limited quantity of agent to the roller in contact with the sensitised portion of the strip.

In fig. 1, *a* is a light-tight chamber containing a guide *b* provided with flanges c, c (fig. 2), to receive the edges of the photographic strip *d* which has been exposed to light and which is fed by suitable mechanism, the sensitised side of the strip being upwards

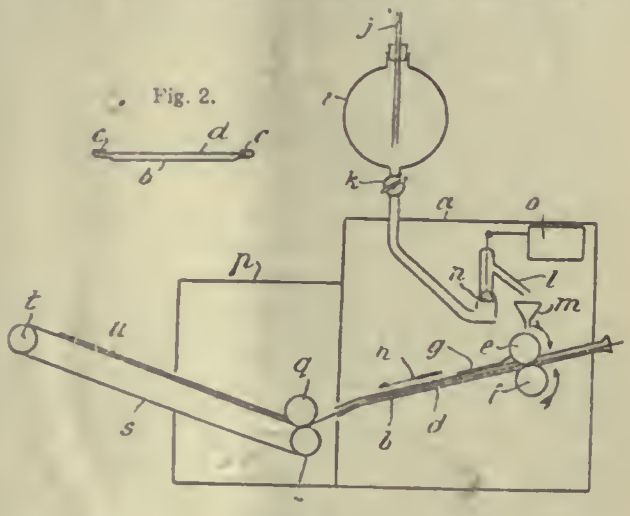

Fig. 1.

The strip passes between rollers *e* and *f* driven by the same mechanism, and *g* is a tongue of metal which lightly rubs the sensitised side of the strip while this is moving in the direction of the arrow *h*.

The devloping agent is contained in a flask *i* without the chamber, and is provided with an air inlet tube *j* and a regulating cock *k*; the developing agent flows out through the pipe *l* into the funnel *m*, when the valve *n* is opened by the action of an auxiliary relay *o*, which may be energised at the same time as the motor mechanism.

The photograph is fixed after passing out of the developing chamber by immersion in an accessory chamber *p*, containing suitable apparatus formed of two driving rollers *q r*, belt *s*, and roller *t* for leading the strip upon which is the fixed photograph to light where it is then visible near to *u*.

The apparatus works as follows: When by means of a suitable arrangement the paper is moved and the relay *o* simultaneously energised, the valve *n* opens and the developing agent moistens the sensitised portion of the strip by the action of the roller *e* and the tongue *g*. The function of the tongue *g* is to ensure an equal distribution of the developing agent. On arriving at the end of the guide *b* development is complete, and the sensitised paper or strip is immersed in hyposulphite contained in the fixing chamber. The negative is sufficiently fixed to be immediately observed by daylight.

This arrangement allows the developing agent only to be used for a strictly necessary period, and on the other hand it is preserved from access to the air in a closed flask containing it.—Alexandre Eugene Dufour, 11*bis*, Rue Lagarde, Paris.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, October 26.

Huddersfield Naturalist and Photographic Society. "The Social Evolution of the Honey Bee." Rev. W. E. Goodreid.

Monday, October 28.

South London Photographic Society. "Oil Printing and Transfer." F. T. Coupland.
Bradford Photographic Society. Demonstration: "Bromoil." W. E. Gundill.

Tuesday, October 29.

Manchester Amateur Photographic Society. Lecture on Colour Photographs on Paper. M. F. J. Stockley.

Wednesday, October 30.

Croydon Camera Club. "The Humour and Pathos of London Streets." A. H. Blake, M.A.
Ilford Photographic Society. "One Man Portfolio." G. B. Clifton, F.R.P.S.

Thursday, October 31.

Brighouse Photographic Society. Whist Drive.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, October 22, Mr. W. B. Ferguson in the chair.

The lecture on "Control in Bromoil" was delivered by Mr. G. B. Clifton, who dealt at length and in a most practical manner with the technique which he had himself come to adopt during his employment of the Bromoil process as an artistic medium. Apart from the control of tones afforded by the Bromoil process Mr. Clifton dealt with the combination of Bromoil and pen-and-ink work with which his name as an exhibitor at recent exhibitions has been associated. In reply to a question Mr. Clifton said that any pen-and-ink work was done before the inking-up.

The proceedings terminated by a hearty vote of thanks to Mr. Clifton.

CROYDON CAMERA CLUB.

Camera clubs, like photographic journals, to a large extent must live on repetition for the benefit of new recruits, and last week Mr. H. C. Inskeep demonstrated a familiar subject—"Elementary Intensification and Reduction." Without cavilling at the wording of the title (due to that non-committal fixture-list drafter, Mr. Sellors), it is necessary to explain that the processes were not left at an elementary stage, which would be chaotic, nor was the exposition an elementary one. Though not pretending to be exhaustive, much sound advice was afforded the beginner, and also interested those who for years have toyed with a camera, and from time to time pick up, and as speedily forget, instruction as it comes along.

Not having reached that joyous stage of club reporting which, for instance, informs an astonished reader that white light is composite in character, or an over-developed negative of a flashlight group tends to give a print violent in contrast, much that Mr. Inskeep said is perforce left unrecorded. The "B.J. Almanac" contains a selection of formulas sufficient to suit all tastes. The genius who evolved the addition of oxalic acid to the sulphite bath, to ensure with Croydon and other ultra-hard water, a deposit of lime on the negative simultaneously with the removal of any stain after reduction with permanganate, deserves to be appropriately thanked. The sulphite of soda does the trick by itself in perfectly satisfactory manner.

Combining the lecture and discussion into one scintillating brain wave, a part of its structure may be described. Of course, our old friend the ammonium persulphate reducer come in for the usual abuse, including Bennett's modification, which some considered more criminal than the original formula. The addition of acid, pieces of P.O.P., the employment of distilled water, received scant praise, the first, however, being recommended by one or two. Even the diplomatic Mr. J. McIntosh, in an article on intensifiers and reducers, has admitted that the persulphate is somewhat capricious in its action. Chemists have stated there is no reason why the salt should reduce at all, and certainly up to a certain variable stage it often seems to be of the same opinion. Then comes a reversal of ideas followed by swift action, and frequently terse language on the part of a dismayed operator. Mr. King provided the inevitable exception by saying that in his hands the persulphate had invariably answered well for a moderate amount of reduction. He had also secured very harmonious reduction by immersing the negative in a clean hypo bath (4 ozs. to the pint), and then rearing the negative up on a shelf for twelve hours or so. In very hot weather there was a tendency to frill, but apart from this the method was a safe and good one. It need hardly be said that the reduced negative is subsequently well washed.

It was pointed out by the lecturer that the permanganate reducer applied for a short time to a dry negative gave a "persulphate effect," and a portrait negative of a lady in white blouse (and other garments) cut in two and one half so reduced, showed the high-lights markedly lessened in opacity without degradation of tone, and shadow detail in the dark hair well preserved, despite the fact that the shadows were almost of a clear-glass type. Few, apparently, had tried this valuable method.

Regarding intensification, the general verdict was in favour of the chromium method, on the ground of certainty of results and permanency. Negatives so intensified when the process was first introduced had shown no sign of change. Very different tales were told about mercury—intensified negatives, most of which had changed in colour or faded, or both. When re-developed with ferrous-oxalate no change had been observed. With the chromium process a safeguard is to conduct all operation to the end of re-development in a very feeble artificial light, or better, yellow or orange light. A worker who had met with frequent trouble by not following this procedure said he had experienced no failures since its adoption. On this point Mr. Keane said he thought when sulphide-toning bromide prints he had obtained finer and warmer tones by bleaching in orange light, but further experiment was necessary before he could speak with certainty.

A most cordial vote of thanks was accorded Mr. Inskeep for a most thoughtful contribution, illustrated by many strip negatives showing the various characteristics of different intensifiers and reducers. He is the guardian of the refreshment department, and not once has the cupboard been bare, a wonderful record in these times.

News and Notes.

Society of Master Photographers (Lancashire and District).—A general meeting of the society will be held on Wednesday, October 30, at the Manchester Chess Club, 65, Market Street, Manchester. Chair will be taken by the President, Mr. N. S. Kay, at 6 prompt. The officers and committee have two important recommendations to put forward for the serious consideration of members, and trust, as a convenient centre (Manchester) has been selected, every master photographer in the district will make an effort to attend this meeting.

Old Negatives.—According to the "Portsmouth Evening News," The Director-General of National Salvage has been requested by the Ministry of Munitions to assist in the collection of old glass photographic negatives. These are urgently required in connection with the manufacture of eye-pieces for gas helmets, the process being to remove the film, after which circles of 2¾ ins. in diameter are cut. Any size from quarter-plate can be used for the purpose, providing the thickness does not exceed 1-16th inch. Amateurs and others having old negatives which they are willing to contribute for this purpose are invited to hand them to any of the branches of Messrs. The Timothy White Co., Ltd., who have kindly consented to allow their various depots to be receiving offices for small quantities.

Tribunal Appeals.—At the Preston Borough Tribunal recently, when two photographers had their exemptions reviewed, Mr. Moore (N.S.R.) stated that there was an urgent request from the region to get more photographers for the Air Force. It was immaterial whether they were Grade II. or III. men.—Mr. Smith, on behalf of one of the men, contended that there was no guarantee that they would be used in such connection, as experience showed. They were simply put where the Army people wanted without reference to special requirements.—Mr. Hull said they must take it that it was not a trick on the part of the authorities.—The Chairman: And we cannot ignore such requests.—Domestic and personal grounds in one case helped him to get a respite to January 1, while in the other an adjournment was granted to allow of a further examination.

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

THE PRICE OF DRY PLATES.

To the Editors.

Gentlemen,—Before you close your columns to the subject, I should like to give you my experiences. Passing a well-known photographic dealer's establishment in Cheapside one day this week, I saw an unusually large crowd before the window, in which were to be seen cameras, etc. There were also piles of boxes of dry-plates bearing labels unknown to me, and the prices were marked "¼-plates, 1s. 10d.; ½-plates, 4s."

Such a bargain was not to be missed in these days of inflated prices, so, taking up my place in the queue at the photographic counter, I was able to get a box for some trial exposures. The plates were excellent, and on Saturday I went again, in order to purchase as many more as the firm would let me have. I found, however, that all had been sold except process plates—the latter also at the prices named, but I was told that another huge supply was on its way and would be on sale next week.

Rumour says that the plates are of Japanese manufacture, and the name of a Japanese town on some of the boxes gives colour to the tale, but the lady with whom I talked at the counter told me that the plates were made in London.

Anyway, there they are—or were—a fine example of what some-one can "do" at 1s. 10d. and 4s. for quarter and half-plates respectively, and if one firm can supply at those prices why not another?—Yours faithfully, G. W.

FINDING OUTDOOR LIGHTING.

To the Editors.

Gentlemen,—The method described for the above purpose on p. 447 would no doubt be useful in such work as Mr. Charles describes both to professional and amateur. It is, however, by no means clear to me how in the method set forth one could find the best light direction for the case illustrated in fig. 3. This is obviously an evening exposure, and the camera position shown, used at 7 to 8 o'clock in June is workable. If we look at table p. 449 that time is signified by numbers 93 to 102. If, however, we follow the procedure given, supposing the subject to be in centre of dial fig. 1, we get 30-20 as the light direction which table p. 449 tells us is a morning exposure, and fig. 3 shows to suit the back of the house. Do not the figures require some revision? Is not fig. 2 marred by the W and E which transpose sunrise and sunset? All that the indicator requires is placing of the north and south points. The diagram is not a map, and the right side is not East but sunset side. OLIVER HORTON.

Glasgow, October 15.

[We have submitted the above letter to Mr. Charles, and give his answer.—EDS., B.J.]

To the Editors.

Gentlemen,—I cannot find anything in my article which suggests that the subject should be "supposed" to be in the centre of the dial, as your correspondent imagines. In giving the instructions for using the dial, I did my best to base them on actual facts that exist, and not on any suppositions, but it may help explanations if it is imagined that the sun is the centre of the dial, then any line from it to the edge is the direction of the shadow it will cast at the time of day indicated by the number on reference to the table; that is, the "light direction."

Another error that occurs in my critic's letter is when he states that 93—102 would be the proper "light-direction" for figure 3. Obviously that lighting would fall directly at the front of the house in the sketch, and would give a flat picture with no light-and-shade at all. I would ask him to examine any subject and decide what lighting would suit it. Then, and not before, get his dial out. The position of the camera would not alter anything, except that if the sun shines in the lens some other lighting must be chosen.

His third point seems a mere quibble. It was not essential to have the points E and W marked, but surely they do no harm. Perhaps confusion is on account of the old rule of the sun rising in the east and setting in the west. So it does, roughly. But when it rises in the east it will shine towards the west, it will cast a shadow towards the west and so its "direction" is westward. That is why the left-hand side of my dial is not only west when used on a map or with a compass, but it also indicates the direction numbers for sunrise.

In figure 3 as the sun shines westward nearly all the morning it would light only the back and end of the house, and would point right to the lens. At dial number 70 it would shine along the face of the house, casting long shadows from projections, and dial number 80 would be the earliest that a fairly normal lighting would exist.—Yours faithfully, D. CHARLES.

France, October 21.

THE PROBLEM OF PHOTOGRAPHIC POISONING.

To the Editors.

Gentlemen,—When the Great War comes to an end and we are able to settle down more or less comfortably to photographic and normal pursuits, I trust some very special effort will be made by the medical fraternity to investigate more fully metol and other forms of photographic poisoning. We have amongst us, I know, several medical-photographic men who are well able and fully qualified to give special attention to the problem, and a recent experience leads me to beg of them to do so.

That cases of poisoning by metol, bichromate, and other chemicals used in our profession are becoming more common, no one who has their fingers on the pulse of the photographic profession will deny. Cases, too, are, I venture to state, more serious, and the attacks more severe than they were a year or two ago. But that the increase is due to the introduction and use of substitutes for German-made chemicals I am not at present willing to admit, though the increase and severity of cases certainly coincides with the departure of German chemicals and the coming of the British agents.

Speaking for myself, German-made metol caused me more suffering than those of the British-made variety now being sold, for while in pre-war days I never dared to use metol without taking all known precautions, to-day I suffer no inconvenience after using British products, even when I take no precautions, but with many workers the reverse is the case.

My own sufferings after using metol have in the past been bad enough, but not nearly so serious as in the case of a friend with whom I have been associated for many years, and who is well-known in a certain branch of photography. This unfortunate worker has spent the best part of the past fifteen years in a dark-room making up and using metol-hydroquinine is about nine gallon lots, and having his bare hands—and at times even his arms up to his elbows—in the developer. At one period he wore rubber gloves, but familiarity bred contempt, and after a few trials without gloves he found that the solution appeared to have no evil effect upon his hands and general health, so he gave them up, probably in the belief that chemicals could do him no harm. But I regret to say that he has now fallen a victim, and after being an out-patient of a hospital for about twenty weeks has taken to his bed, where for more than a week he laid in a most critical condition. I am glad to report, however, that he is now on the road to recovery, though his period of convalescence will be a most protracted one, and it is very doubtful if the specialist's dark-room will ever see this expert worker again.

The first feeling he experienced of the evil effect of chemicals coincided with the departure—or non-arrival, shall I say?—of the German-made agents and the use of British products. Now I am not going to blame the latter without further and most expert evidence, although some are prone to do so. The appearance of the trouble and the use of British goods may have been a most unfortunate and a very remarkable coincidence.

The victim, it may be mentioned, is attacked the most seriously in the throat and nose. The disease had no doubt been latent for many months, and perhaps years, and now that it has developed it appears to be doubly severe.

I have no wish to pose as an alarmist, but the case is, I think, worthy of record, and the moral is sufficiently obvious, and other dark-room workers who now consider themselves immune may take warning.—Yours faithfully, M. Q.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

F. R.—The list price was 35s.; about half price would now represent its market value.

T. M.—We have no catalogue by us which includes this lens, but should say £5 or £6 would be a fair price. Lenses of this type usually have a rather round field, but a 12-in. lens should cover a cabinet at least as well as a portrait lens of the usual type of equal focal length.

CALACHROME SEPIA TONING.—Could you oblige with the address of the makers of "Calachrome" sepia toning solution, for which I would thank you in anticipation.—ZEPP.

We are sorry we can give you no information concerning Calachrome, as we have never heard of it. Perhaps some reader may be able to inform our querist.

FINGER STAINS.—Could you please tell me how I could remove developer stains from finger nails? Being a printer I find it a great drawback.—C. M. C.

We are afraid there is no remedy except pumice stone. As preventive you need to keep the fingers well rinsed after every use of developer and also to rub fingers and nails regularly with an emollient, such as lanoline ointment.

LOCKETS.—Can you kindly supply me with the address of a firm who supply open-faced, gold-plated lockets, suitable for coloured miniatures, or a firm who supply miniatures and lockets fixed up complete?—THOS. A. BERKLEY.

Messrs. J. Fallowfield, 146, Charing Cross Road, London, W.C.2; or J. Elliott, Parade Works, Nottingham, will probably be able to supply you or Messrs. Dorrett and Martin, Belle Vue Road, Wandsworth Common, S.W.

EQUIVALENCE OF ALKALIES.—1. Can you advise me the equivalent quantity of carbonate potash or carbonate soda (crystals) to replace hydrate soda in developing formulæ? 2. Also, Which is the most suitable of these to use with hydroquinone-eikonogen developer to avoid excessive contrast?—EBORACUM.

1. There is no chemical basis in which to substitute a carbonated for a caustic alkali. We can only advise you to follow the published formulæ. 2. Carbonate of potash is the most suitable alkali for eikonogen-hydroquinone.

MINIATURES.—I would like to know the method of fixing celluloid facing to coloured miniatures, also the best market to purchase sheet celluloid for this purpose.—R. W.

Celluloid surfacing is done either by dipping the prints in methylated spirits and then hot-rolling the celluloid down on to them, or by using a special cementing solution for the celluloid. Messrs. Fallowfield supply apparatus for this purpose and also issue a leaflet of instructions. The cementing solution and celluloid can be obtained from Messrs. Rheinlander and Son, New Malden, Surrey.

ARTIFICIAL LIGHT STUDIO.—I have two rooms made into a studio, which I thought of fitting with half-watts. The room I intend using as a studio is 12 ft. by 11 ft. Would three 1,000 c.p. lamps be enough for all-round work? Also would you inform me of the best way to fit them?—F. H.

A total length of 12 ft. is very short for a studio, but would answer if full lengths are not required. The three 1,000 c.p. lamps will be ample. One should be put in the middle of the ceiling, about 6 ft. from centre background, one 3 ft. to the side of it, and one about 4 ft. 6 ins. from background and 6 ft. from floor to give a side light.

H. G.—In the absence of a written undertaking as to the date prior to which all receipts shall fall into the hands of the vendor of the business, it is a very difficult matter to suggest a basis for arrangement. There is no established custom of the trade in this respect so far as we are aware. In a court we should say that the purchaser, in the absence of agreement otherwise, would be allowed to take all receipts which come into the place subsequent to his assuming possession without respect to the date on which the orders were executed. We think that if we were you we should suggest to the purchaser that the matter might be arbitrated by the Council of the P.P.A. Probably both the purchaser and yourself are personally unknown to any members of the Council, and we are sure that they would arbitrate in a perfectly impartial manner.

FLAT-WORKING PAPER.—I have a quantity of soft bromide paper which will only give a decent print from a cast-iron hard negative. As I usually make average negatives, but want to use the paper if possible in these scarce times, will you suggest any developer that will be likely to give a greater degree of contrast with medium negatives? I find metol-hydroquinone with added bromide is better than amidol, but even this produces rather washy prints. I do not think there can be much silver in the emulsion. The tone of the image is always very blue—not black.—OTHELLO.

About the best developer is hydroquinone alone, although the prints will be bluish rather than the amidol black. In order to guard against blisters the formula should not be made up with caustic alkali, but with carbonate, say, as follows:—

Hydroquinone	100 grs.	11·5 gms.
Sodium sulphite	1½ ozs.	75 gms.
Sodium carbonate	3 ozs.	150 gms.
Water to	20 ozs.	1,000 c.c.s.

The British Journal of Photography.

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SUMMARY.

A lecture on lenses has been delivered to a meeting of New England photographers. In an editorial article we comment upon some of the statements made therein, with special reference to "soft focus" portraiture. (P. 490.)

The possibilities of panoramic work as a remunerative branch of professional work, with suggestions as to the class of subjects which may be satisfactorily dealt with, is the subject of a note on page 439.

At a council meeting of the Professional Photographers' Association a report was made of steps taken in the matters of plate prices, the proposed luxury tax, and recruiting for the Royal Air Force. Representatives of the Lancashire Society of Master Photographers were present. (P. 494.)

The desirability of providing or adapting apparatus for special classes of work, such as difficult architectural subjects, so that they can be undertaken without delay, is pointed out on page 489.

It seems that in America photographers have had to contend with the same shortness of skilled help that has troubled their English brethren. A well-known professional has given a lecture on steps he had taken to cope with the difficulty, and we think most of his points could be adapted with advantage on this side. (P. 491.)

An interesting letter upon the ghostly images sometimes occurring on plates which have been re-coated with emulsion, in which the writer attributes such images to molecular changes in the glass, appears on page 495.

A writer points out the urgent necessity for further organisation among professionals in view of problems which are likely to arise after the war. (P. 495.)

Gelatine mountant, electric lighting for the studio, asphalt varnish, and studio construction are among the subjects dealt with in "Answers to Correspondents." (P. 496.)

The result of tribunal appeals at Bath and Haywards Heath is given on page [illegible].

A generous offer of free treatment for metal poisoning is made in our Correspondence columns. (P. 495.)

"Colour Photography" Supplement

Although little Autochrome work is now possible, readers will welcome the suggestions for displaying their existing specimens which [illegible] page 41.

[illegible] processes of colour printing form the subject of "[illegible] Practice." (P. 42.)

An application to the Patents Court for a licence to use a German patent for the manufacture of sensitised paper and photographic developers for producing a permanently tinted photographic print is referred to on page 44.

EX CATHEDRA.

The Camera for the Job. In photography, as in many other crafts, many difficulties in special work are smoothed away by the use of a tool designed for the special purpose. We are reminded of the truth of this fact by noticing in the American papers advertisements of a so-called "sky-scraper" camera constructed by the Folmer and Schwing division of the Eastman Company for the photography of tall buildings and for other subjects where great rise of front and excessive swing-back movement are needed. A camera of this kind permits of certain subjects being satisfactorily dealt with in circumstances when, without it, they could not be attempted; and it also immensely reduces the time and trouble which would have to be expended in tackling somewhat less exacting subjects with a camera of the ordinary type. In thus aiming at an instrument for special work, it is not always necessary for the photographer to suppose that he must buy a commercial article, or, if there is not one, wait until the makers originate one. A great deal can be done in the way of adapting an old-pattern camera for a special purpose, as can be easily done when it is not necessary to unite in one instrument the various movements which are expected for general use.

* * *

Panoramic Photographs. From a business point of view, the difficulties and shortcomings of panoramic photography have been rather over-estimated, and until the introduction of the Cirkut camera professionals were rather shy of attempting this class of work. There are, of course, many subjects, and these of the most desirable type for which the panoramic camera is unsuited, and these have brought the style into disfavour. For example, a long building, such as the British Museum, standing in a narrow street would be represented as tapering off at both ends, and hence would appear as displeasing to most people who are only accustomed to plane perspective. But this is an extreme case, there being many other subjects which are quite suitable. Open country scenes, such as dairy farms, with detached clumps of buildings, with trees and cattle, and many architectural subjects which are not required to be in front elevation, will show no appreciable distortion; while open-air ceremonials, fairs, and the like are quite suitable. One point we have noticed with regard to most panoramic cameras is the small aperture of the lenses fitted. This is doubtless due to the necessity for obtaining sufficient depth of field, but as very near objects are seldom present in panoramas, and only short focal lengths are needed, there seems no reason why an aperture as large as f/6 should not be available. Another weak point in most cameras is the great speed of movement of the exposing slit, precluding work in anything but the best of light. If a clockwork regulator, with a fan, could be fitted, the utility of the apparatus would be enormously increased. It may be necessary to add a word of caution to those who contemplate changing the lens on a panoramic camera for a more rapid one, and that is that the curve of the film must be suited to the exact focal length of the lens, and it is a thousand to one chance against this being the case in fitting a new lens.

* * *

Correspondence. We believe that we are not making a false deduction from our experience when we say that photographers as a class have not the sense of the importance of properly kept correspondence which the average business man has. In the many cases of business disputes which have been referred to us at one time and another it has almost always been the case that the complainant could produce only one half of the documentary evidence—viz., the letters from the other party to the controversy. Of his own he had no copies, and had to rely on memory to describe their contents. It does not appear to be fully enough realised that a systematic duplication of correspondence is necessary in respect to any dealings which are or may become commercial. Means of making a facsimile copy are so readily available under such different forms as typewriter "carbons," duplicating tissues, or even the old-fashioned letter book, that there is surely no reason why this means of keeping transactions straight should not be a universal rule, the adoption of which would save many a dispute from running to an extreme length.

A TALK ABOUT LENSES.

At the recent convention of the Photographers' Association of New England, Mr. Joseph A. Dawes, of the Wollensak Optical Company, addressed the members upon the subject of lenses. In introducing him, the President said that the fault of most who dealt with the subject was to fill their lectures with technical uninteresting stuff, and that on this occasion the speaker was going to steer clear of this error. The discourse which followed certainly justified this preface—in fact, to such an extent that the photographer with even a little technical knowledge could see that some of the statements were not in accordance with accepted facts, and that remarks were made which did justice to neither the older portrait lenses nor to the newer anastigmats. On the other hand, when Mr. Dawes came to talk upon business matters and methods, he offered some valuable suggestions. We hope, therefore, that he will take in good part both our criticisms and appreciations.

One of the points on which we must join issue with the lecturer was the statement that because the Petzval type of portrait lens has a curved field, it gives a standing-out effect, and that because it has great focal length it gives perfect perspective. This is simply incorrect. The old opticians did all they could to secure flatness of field, and the roundness of effect, as far as it existed, was due to the large diameter of the glasses, and not to the type of construction. As far as the focal length is concerned, it is only necessary to point out that in the older lists lenses of ten to thirteen inches focal length were usually employed for cabinet size, and that sixteen inches was practically the maximum. Now the tendency is to use greater focal lengths, so that sixteen inches becomes almost the standard, while eighteen to twenty-two inch lenses are used for cabinet heads where the length of the studio allows.

The statement that an anastigmat fitted with a diffusion arrangement would not produce as good a portrait as the older type of portrait lens does, is not in accordance with facts. If Mr. Dawes will investigate the Cooke portrait lens we think that he will change his opinion. Here is an anastigmat capable of giving critical definition; it has lenses of large diameter, which will give the "outstanding" effect, and it has, moreover, a "diffusion" adjustment by means of which any degree of softness can be obtained. We make this point because we do not think it necessary to abuse good lenses in order to call attention to instruments made for the express purpose of giving diffused images, or, as they are generally called on this side, soft-focus lenses. With his remarks on this type of lens we are in cordial agreement, particularly on the point that chromatic as well as spherical aberration is needed to give the finest quality of diffused image. In connection with this we may recall an incident which occurred a good many years ago, when the Dallmeyer-Bergheim lens, the first exclusively soft focus lens to be placed on the market, had been issued a few months. A well-known photographer had been using one of these lenses with considerable success, but found the necessity for making allowance for chromatic aberration a trifle bothersome. He approached the makers on the subject, and suggested that a lens constructed upon the same lines but achromatised would be the ideal instrument. One was made and submitted for trial, but to his dismay our friend found that the "Bergheim" quality had vanished, and that he had nothing but a fuzzy image. We do not think that we need to seek far for the cause of the superior quality of the image given by the uncorrected lens. As is well known, such a lens gives a series of images focussed one behind the other on different planes. When the most actinic of these is focussed upon the plane of the plate, a partly sharp image is formed, and this is supported by other images formed by the remainder of the spectrum. A similar multiplicity of images is formed by reason of the spherical aberration, and the combination of all these images gives the plastic result characteristic of this type of lens. For the benefit of those who have not used an uncorrected lens, we may point out that the best results cannot be obtained by focussing on the point—usually the eye—which is to be sharpest in the picture; if this be focussed it will not be sharp in the negative, and the more distant parts of the head, say the ear and hair, will be very badly defined. If, however, the focus be obtained upon a printed card held near the ear, then the eye will be the best defined point (although not sharp) and the ear and hair will be less, but still sufficiently, well-defined.

The lecturer, in referring to the desirability of making enlargements from sharp negatives by means of a soft-focus lens, raised a point which had formed the subject of an "Ex Cathedra" paragraph some time back. We asked why enlarged photographs were always labelled as such, and thereby stigmatised as something not equal to a direct print. It seems that on the other side of the Atlantic they have made a virtue of the enlarging, and call such prints "projected," getting a much better price for them than for the ordinary contact-printed ones. While on the subject of soft focus projection, it is interesting to recall the fact that before the days of photography, when all lantern slides were painted direct upon the glass, it was usual to employ a "soft-focus" lens for projection, so that the hard outlines and crude patches of colour were presented in a less harsh form than they would have been by a perfectly corrected lens. To return to our subject, the experiment of using a soft-focus lens for enlarging, especially from copy negatives, is well worth trying. In default of a special lens, the front combination of a small portrait lens may be used, of course at full aperture. If a Dallmeyer "patent" portrait lens is available, the diffusion adjustment may be used to its fullest extent—that is to say, until the cell is almost falling off; the largest aperture is usually the best to use, as a small stop removes the spherical aberration upon which the degree of softness depends. There is no doubt that the taste of the public is becoming educated, and that the great bulk of ordinary folk who ten years ago demanded sharp, shiny prints are now pleased with soft matt surfaced platinums or bromides. A few specimen enlargements made in the way suggested would cost little, and should prove to be business bringers.

Our American friend goes very wide of the mark when he deals with the cleaning of lenses, and deprecates the use of alcohol, which he stigmatises as a particularly British error. We can assure him that we recommend alcohol because it is the best thing to use if you know how to use it. A British optician does not take a "bottle of alcohol" which may contain "particles of grit" and "spill it over" the lens, but he takes one drop of pure alcohol at a time from a carefully stoppered bottle, and drops it on the lens, carefully rubbing it with a soft silk rubber so as to avoid touching the blacking or lacquer on the cells. Nothing but alcohol or petrol will remove the tarry, oily deposit which is formed by a few days' exposure to the atmosphere of a large English town. It is very unsafe to remove the components of an anastigmat from their cells for cleaning, as their adjustment is a very delicate matter, and the definition is often impaired if this is disturbed. Clean the outside surfaces as often as needed, but beware of the inner ones. If the cells are properly fitted and kept covered up when not actually in use, the inner surfaces of an uncemented lens should keep bright for years. With regard to the discolouration of lenses, this is not always, or even usually, due, as Mr. Dawes supposes, to deterioration of the balsam, but is more commonly an actual darkening of the glass itself. This has been proved to be the case by comparing two lenses paired for stereo work, one of which was used for C.D.V. negatives in the studio, while the other was kept in the safe; the difference in colour after two or three years was so great that they could no longer be used as a pair. Not only exposure to light but heat will cause a lens to darken; therefore it is not desirable to use a costly lens regularly in an enlarging lantern fitted with a condenser and a powerful light.

Because he cannot tinker about with it as he can with a camera, the ordinary photographer usually understands little about his lens, although we have done all in our power to help him to do so. This is perhaps due to the feeling that apparatus is a necessary evil, not to be thought about except when actually in use. If only a little interest can be taken in lens matters, it will be found a very interesting study and a profitable one, for many a substantial cheque is practically thrown away in purchasing unsuitable or needlessly expensive instruments. Like most other things, portrait photography is passing through a great change. Mr. Dawes is a true prophet when he says that the soft-focus lens has come to stay, and that in the near future it will be the standard instrument. Some extremists in the early days brought it into discredit by going beyond the permissible degree of softness, and the word "fuzzytype" was coined to describe their productions, but between these and the microscopically sharp productions of the Victorian school there are many grades, and it is for the individual worker to select that which best realises his idea of pictorial definition.

AMERICAN WAR-TIME NOTIONS.

The address by Mr. Ryland W. Phillips before an American convention, which we reprint below, reflects conditions in the United States such as we have been familiar with here for several years past, yet is worthy of some attention as indicating the ways in which our American friends are dealing with the labour problem. Some of these have of course been followed here; in the case of others it may be said that this economy of labour has not been so fully tested as it might be.—[Ed., "B.J."]

I have tried to think along the lines of what can be done in the photographic studio, and I have taken the idea of the general studio. A great many of the things I shall say will not apply, possibly, to certain individuals, but my talk will be along the lines of accomplishing the most with the least amount of labour, because with five thousand photographers in the service of the country, there is a great scarcity of labour in our studios. It has made it necessary for us to stop and think as to just how we are going to fill their places. In some cases it is almost impossible to fill the positions. I know in our town there are people who are begging to get help. With the scarcity of labour and the influx of war business *we are up against it* to know how to get our work out.

The Women Can Make Good.

The first answer, or part of the answer, to that proposition is to get yourselves into the attitude of mind where you recognise what I consider a truth, and that is that the *brain* of a woman is just as good as the *brain* of a *man*, and when you get a woman to thinking along the lines you want her to think in your studio, the chances are she is just as good a producer as a man. The influence of women is growing in all kinds of service—in war service, in charity service, and in helping in all ways. To-day the society women of all the great cities do not feel as though they are doing their part unless they have some sort of a job every day that is helping along in this war work for the boys that have gone to the other side. So that women who three years ago would not have thought of taking up a job in a studio are now ready to take up something which they can do, because everybody else is doing something, and a girl who is not doing anything feels as though she were out of it. Take on the women; they are smart enough to learn everything that you can teach them. Teach them to use their brains along your lines and before long you will find out that your studio has a whole lot of good women who are turning out work just as good and possibly a little better, because they haven't a whole lot of old tricks that they have learned in other studios that you can never knock out of their heads.

Reduce the Number of Styles.

Another point. Start in the downstairs room, or the room in the front of the house, the room into which your subjects enter, the people who want to be photographed. Make a pile of pictures on one side that you have not sold from for at least six weeks. Then examine the other pile. You will see what you have that has been sold from. Take these out and see how many different sizes there are, and by a process of elimination I believe it will be possible for you to cut down your styles just one-half. Now the moment you do that you are cutting down the necessity for a variety of labour, and when you do that you are making for efficiency, for saving of time. There are people who only make one size of picture. There are some people who only make two sizes of picture, but you will have to arrange that according to your own particular studio. I venture to say you will find pictures that have been there for three years, and the girl has just let them be in there and worked them over all the time, and nobody has ever paid any attention to them at all, and you have not sold any of those styles for months and months. Cut them down to a concrete basis—where you have only a few styles you are saving time in all the rest of the departments of the business

Plate-holders Save Labour.

Now go to the place where we make negatives, the negative room, or whatever you call it. Some people call it the operating room, but that sounds like a hospital, and I do not like it. In the first place, remember that you are scarce of help, no matter how many women you get in, no matter what your accommodations are. You are bound to be scarce of help as long as this war lasts, or I should say until we win the war. When you look over your studio room see whether you have just as many plate-holders as it is possible for you to use. For instance, take a whole morning, for every photographer ought to have laid up enough material in his dark-room to last him all that morning at least. I try to have enough to last me a day. We are glad when we have to change some over, because we have had a big day. Have plenty of plate-holders, just as many as you can get. What will it amount to in the long run so far as cost is concerned? Have two or three or four dozen plate-holders. You will make that all up, so far as the cost is concerned, in the saving of time in a very few weeks. Go into your dark-room. Dust your plates. I suppose you have heard this thing thousands of times. I venture to say that any demonstrator can tell me that within the last four or five days he has found dust on the plates where a man has had some trouble in some way. The real reason, now more than ever before, is the fact that the conditions of shipping are such that when the plates start from the factory and are put on the cars they get the roughest kind of handling. I saw an instance where a plate was taken out of the box, and you could take your finger and rub over it and see the mark on it. That is a fact. A number of demonstrators since this thing occurred have seen the same thing. We have found that to be the case at the present time on account of the shipping conditions. It is a thing that we cannot help.

Double-purpose Negatives.

At the present time there is a growing demand for small pictures of soldiers. Their family want to have a picture of the soldier and every soldier wants to have a picture of the family. The consequence is there is a big sale for the small pictures that they can carry around in the khaki uniform. They all want them. How would you proceed with regard to that? Would you make the picture the size that will go into that case? I think not. I would suggest making the pictures a size that would be large enough so that if something happened—God grant it does not—but if something happened to that boy you would have a picture that you could make as large as you wanted to, and if you make your picture on a 5 × 7 plate or a 6 × 8 plate, you *have got something.* It is an easy thing, as most of you know, to have your enlarging and reducing camera rigged ready on the dot all the time. Then all you have got to do is to make them six or eight or ten or twelve pictures, whatever they want—in the small size by sticking it right into your camera and making the size they want, showing them first the other proofs, and making the pictures for the cases just exactly the size they want. It also eliminates another thing, which some of you may find, that the size of the case has not been chosen, and the size that you have they do not want. They want some other particular size that they have seen. You have got them there, and you don't want to tell them to go out and get the case—and lose them. Make your 5 x 7 picture right then and there and then you have them. Then they haven't a chance to go anywhere else. Snap them while you have them. If you will get that enlarging camera fixed up so that it is ready to work all the time you can simply go at it at any time, and you have always got it rigged up.

Those Unused Accessories.

Now, I have a note here which says "get rid of junk," and I know that hits everyone. I will bet the dollar my wife won from me coming over here from Poughkeepsie yesterday—no, I will have to bet another dollar, because she won that—but I will bet a dollar that there is not one person in the room that has a studio who cannot go back and find something that he has not used in that studio for six months, and it is in the way. It may be a background that you do not use, or an old headrest, or an old reflector; it is something, and it is not only one something, but it is probably twenty-five or thirty. If you go home and clean up that room you will have room to work in. You will find some spots in there that have not been used for six years, where you can make some first-class sittings, spots that are covered up by these useless backgrounds that you do not need. They are no good; they are catching dust. They are making the whole room dusty. They are getting the dust into your camera, and the dust gets back into your plates, and the retoucher has to take it out, and you are wasting time, all for a little bit of dust.

Artificial Light.

With regard to lights. There are a great many artificial lights, and you can rig them in practically any place. On a rainy day, or maybe a day in December, when the people are coming in pretty strong for the Christmas work, and you are very busy, and you have a sitter for whom you have made one or two plates, suddenly the sky darkens while you are getting fixed for this next plate, and you find that your light has gone. Now, if you have got to go clear back into this corner and pull out your artificial light proposition, and put it down in front of your sitter, and get everything arranged to make the other negative of that sitter, what happens? In nine cases out of ten you do not get that artificial light right, and you make five or six rotten negatives, and that means just so much more time, actual time that you are paying for if you are hiring people. Have your artificial light in such a position that while you are making that sitting, if the light goes back on you, all you have to do is to turn a switch and go on making the sitting. It is possible. I know it is possible because I have done it. It does not cost any more to rig up that way, and then you will not have to stop making a sitting, but can go straight on by turning that switch. The customer doesn't care, because it is just as good. If a person has blue eyes, you might say something like this: "Really, this artificial light will give you a good deal better eye than natural light," and you go right on making that sitting. You can camouflage that electric light if they do not like it, and if you do not know how to *camouflage* you are not a *good photographer.* You should have learned that the first thing. Have that light so that you can turn it on immediately and go right straight on making your sittings. Then you have saved time, and you have just as good negatives in the latter part of the sitting as you had in the first. Use only two sizes of plates, and cut down on the styles if it is possible. With only two sizes of plates you will eliminate the necessity for buying extra plate-holders for the several different sizes, and you will save in the general manipulation all the way through.

Labour-saving in the Dark-room.

I use methods in the dark room that require the least handling of plates. Everyone probably knows of the tank system of developing, whether you use films or whether you use plates. There is a splendid system for plates, as well as for films. If you can use the system of tanks for developing, undoubtedly you will save a lot of handling as far as that is concerned. You will keep your hands out of the solution and not get them so that they do not look respectable to go before your customers. Some time ago I was right up against it myself, and had to get my hands into the developer, and my family and customers and everybody else were shocked at the way my hands looked. Now they have commenced to get respectable again, if I would only wash them. The tanks, of course, are the thing.

Now with regard to the solution. People say, "Well, you have to use so much of the solution and so much of the pyro, and look what your bills will be." If you do not know it, there is a splendid formula for boiled developer. It is practically everlasting, that is to a great extent. You can develop a great number of plates in it, and by a system of strengthening it every so many plates you have got a developer that costs you practically less than your regular developer or your old-fashioned way of developing. This solution will last for a long time, and you can use one solution for practically a week. It depends entirely upon the capacity of your work how much you are doing. Get your boiled developer and go to it with your tanks.

One Printing Paper.

In the print department I have another thing to suggest which will save you a good deal. Adopt one brand of paper. I discovered about two years ago, when I looked over the shelves in that studio down there, that we had fourteen different kinds of paper, each one requiring a particular formula which had been worked out for it. On the shelves were big rows of bottles to make this and that and all sorts of things. I had a chemical laboratory that would have astonished a druggist. Now, I am not talking against the paper people. The paper people will come in and want to introduce their paper to you, but these are war times, and you do not care anything about the manufacturer so long as you can hold things upright. You are looking out for your own interests, just the same as the manufacturer is looking after his interests. Your own interest is to use the simplified form. If you have only got one kind of paper to buy, your printer knows exactly what kind of paper it is going to be, and not only that, but you know exactly what kind of paper it is going to be when you are making your negative. You are more careful; you make one particular kind of negative. When you have six or eight or ten different kinds of paper upstairs, you say any old negative will do. The consequence is you have all kinds of strength of negative. If you have one kind of negative and one strength of paper, then you have got to make the negative right, and the thing you have to do is the thing the American is going to do.

In the Printing Room.

In the print room I can suggest to you the saving of steps. I have saved steps in our printing room. That is, I cannot say I have saved steps, but the men who are in there have saved those steps, because I preach this doctrine to them. We have, or try to have, a meeting every week and we talk things over. We talk about the different departments, and each department comes in with a little suggestion they think will save time, and the consequence is that we all get together, and finally after a few months of that kind of thing you find that certain things are eliminated. Other things that will save time have been added. If a man says he wants a certain thing because it will save time, and he *shows* me that it will, we send down to the stock room and buy it. If we haven't got the money we borrow it. If printing forms are used, it is advisable to have two openings. I suppose everybody has them, but I know there are some people who do not. Probably everybody in New England has them. Two printing openings will save an amount of time taking off the negative. Putting the form on does eat up a lot of time anyway. If you count the time that it takes each time you lift off that form and put the other one on, you would find that in thirty days you would have eaten up a good deal of the printer's time, just in making these changes. I spoke of having the enlarging and reducing camera right in our print room. We have it right there in that room so that it can be switched on immediately.

Gaslight Paper.

There is another thing which we save on, and I find that a great many people are saving on it, too, that is, printing proofs on gas-light paper. The chances are that you can buy a paper which will cost you very much less, and you can put your proofs on that. The next question that comes up is where do you get away from your expense? Well, your proof paper costs you very little more than lots of proof paper that I have been buying in the past year, and you save your expense in time. A man said to me in Philadelphia the other day: "I don't see where you save time. I can take six proofs and put them out here in this window and get them in less time than you can with your gas-light proofs." "Yes," I said, "you can, but you can't get 6,000 in less time." That is what we want to think about because you can run those right off on the postcard idea. You know how quickly you can do that. You put them all into the developer and you save by using the developer that you have used all day. They will go into that old developer just as well as anything else. All you have to do is to use your old developer, and you haven't added to the expense in the developing line. Everybody makes the excuse that this is war-time and you cannot possibly get your prints out until the day after. Think of yourself a little bit, and put your system in so as to save yourself. They are not going to take care of you, if you fail to take care of yourself, if you are not doing business. You have got to look out for yourself, and that is one of the little things that you can do.

If any of you are printing proofs out in the windows, there is one thing you ought to do in regard to this, in regard to time. Suppose you have a cloudy day, and suppose you have fifteen cloudy days in the month, as you sometimes do—fifteen working days that are cloudy. That man who is printing has to take practically all morning, and you may be paying him as much as 15 dols. a week—if you were down in our country you would have to—and he is using up half a day in just printing proofs. He can't get away from it, but that same man can do it in just about one-sixth of the time.

Filing Negatives.

On your negatives use a pen and white ink. A great many people are doing it. If you file your negatives away, and you are looking over them, you pull them out and the white ink stands out perfectly clear against the dark film. You do not have to use any slips to paste at the top, and the whole thing can be seen in the dark room or in the printing room, because here is white against dark, and you have it right there. You can use it at all times. It is good, and it is bright, and it saves a great deal of time, especially when you are looking over old negatives.

Just one more point I want to make here: file the negatives immediately after you have got your order done. I do not know whether you can adopt that or not, but if you can do that, if you have a system of filing negatives as soon as the order is done, any boy or girl in the place can find that negative immediately. If you have your system down so that they are easy to get, then there is not the necessity for piling orders that have been finished, waiting for a rainy day to get these things sorted out. A great many studios still have that rainy day work, sorting out negatives and putting them away in files, etc. If I were you I would not have to put them into files at all. I will tell you why. Because in most studios the duplicate orders come within a month or six weeks after the order has been finished. Now, if these negatives go for this length of time that whole bunch of negatives has to be gone through for that duplicate order. I would like to have some one who does that now keep a record of it and see how often he has to go through all those files to get to a duplicate order for one or two prints, whereas your coloured girl downstairs could go up and get that negative if it had been filed away immediately after it has been printed.

RYLAND W. PHILLIPS.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, November 4.

South London Photographic Society. "Improving the Print." W. Bulloch.
Bradford Photographic Society. Members' Night. "Tips about Apparatus." B. Riley and others. "Flashlight Photography." L. Moore.
Dewsbury Photographic Society. "Pictorial Portraiture Under Difficulties." Mr. and Mrs. F. Toulson.

Tuesday, November 5.

Manchester Amateur Photographic Society. Coffee Meeting.
Halifax Scientific Society (Photographic Section). "Some Hand Camera Experiences." J. A. Wade.

Wednesday, November 6.

Croydon Camera Club. "The Floral and Faunal Remains Found in the Coal Measures." Dr. G. H. Rodman, F.R.P.S.
Edinburgh Photographic Society. Royal Photographic Society Competition Prints for 1917.
Leith Amateur Photographic Association. Social meeting, with whist.

Thursday, November 7.

Brighouse Photographic Society. Lecturettes.
Huddersfield Naturalist and Photographic Society. "The Wild West of Halifax."
Hammersmith, Hampshire House. "One-man Show." Sir Frank Short.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held on Thursday, October 17. Present:—Messrs. Alfred Ellis, R. N. Speaight, W. Illingworth, J. Chidley, H. A. St. George, C. F. Dickinson, Marcus Adams, A. Basil, R. Haines, A. Corbett, Lang Sims, Gordon Chase, W. B. Chaplin, C. F. Wakefield, G. Hana, S. H. Fry, and A. Mackie. The names of thirteen new members were read.

The Hon. Secretary reported that a deputation of the Council had an interview with Mr. Davison Dalziel, M.P., a member of the Select Committee of the House of Commons on the Luxury Tax, and placed before him the view of the Council upon the inclusion of all photographers, whatever their nature, in the schedule of the Luxury Tax. It was represented that photographs taken for commercial and scientific purposes should not be considered as luxuries, and should be free from taxation. With this view Mr. Dalziel expressed his entire concurrence, and promised to place the views of the deputation before the proper quarters. The Hon. Secretary also reported that he had written an article giving the particulars of the application of the Luxury Tax to photographers, and the steps taken by the Council of the Association to secure the equitable treatment of tation before the proper quarters. The Hon. Secretary also reported in accordance with the instructions of the Council, he had written a letter, which had appeared in the "B.J.," stating the steps the Council was taking with regard to the rise in price of plates. He also reported that a deputation of the Council had had a conference with representatives of Messrs. Kodak, Ltd., Ilford, Ltd., the Imperial Dry Plate Co., and Elliott and Sons, at which the position of the manufacturers with regard to the shortage of material of manufacture, the conditions engendered by the situation, and the requirements of the Government were fully explained. It was intimated to representatives of the plate manufacturers that if they had exercised a little more tact in announcing the rise in price to their customers and the necessity for it much of the ill-feeling their abrupt methods had caused would have been avoided, and that if the information then given, or so much of it as it was desirable to make known, had been given it would have prevented much of the tension. It was the opinion of the Council that it was not too late even now to give this explanation. The representatives of the plate manufacturers agreed to consult with the other firms whether it was desirable to adopt this suggestion.

Mr. Marcus Adams said he had had a communication from Lieut.-Colonel Moore-Brabazon, the head of the Photographic Section of the R.A.F., regretting the failure of the negotiations between the R.A.F. and the P.P.A. to secure the latter's assistance in obtaining men for the Photographic Section, and suggesting an arrangement by which the Association could pass qualified men into the section. The Hon. Secretary pointed out that the difficulty all along had been that men who desired to join the Photographic Section, on joining up, had been drafted to other branches of Army service, and that the method suggested by Lieut.-Colonel Moore-Brabazon would not have the effect intended. After some discussion the Council decided to take no further steps in the matter.

The Hon. Treasurer reported that the Inland Revenue authorities had demanded payment of income-tax on the dividends of the Association's money invested in War Loan. He believed that the Association was not liable, but thought it advisable to have expert advice.

Mr. F. Read, Hon. Secretary of the Society of Master Photographers (Lancashire and District), and Mr. Ash Martin, a member of their committee, were then introduced to the meeting.

The case of a member of the P.P.A. in the Lancashire District, in which it appeared that the action of the police authorities was *ultra vires*, was then discussed, and the Hon. Secretary was instructed to ask the opinion of the Association's solicitors with a view to taking up the case.

FORTHCOMING EXHIBITIONS.

October 14 to November 30.—Royal Photographic Society. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

November 9 to 16.—Manchester Amateur Photographic Society. Entries close November 5. Hon. Secretary, Walter Johnson, 30, Hartington Road, Chorlton-cum-Hardy, Manchester.

Commercial & Legal Intelligence.

Legal Notice.—Notice is given of the dissolution of the partnership between Thomas Henry Billinghurst and George Christopher Whelan, carrying on business as photographers at Bramshott Camp, Hampshire, under the style of the Military Camp Studios. All debts due to and owing by the late firm will be received and paid by Thomas Henry Billinghurst as from January 31, 1918.

News and Notes.

Calachrome Toner.—A correspondent, Mr. G. Garner, kindly informs us that this toner, recently the subject of an inquiry, is what was supplied by Mr. F. G. Fowle, 10, Greenfield Road, Tottenham, London. The toning bath consisted of a special solution, to which at the time of use a few fragments of calcium carbide were added.

Re-painted Backgrounds.—In view of the very great difficulty of purchasing new backgrounds, those desirous of re-equipping their studios in this respect will be glad to note that the re-painting of grounds is a service now being offered by Messrs. O. Sichel and Samuelsen, 52, Bunhill Row, E.C.

Obviously the fabric of the background required to be in reasonably sound condition, but in other respects the grounds can be remade equal to those freshly painted.

United Stereoscopic Society.—At the annual general meeting of this Society the following members were elected officers for the ensuing year:—President, A. T. Mole, L.R.A.M.; Vice-Presidents, W. Reynolds and J. I. Robinson; Hon. Vice-Presidents, Victor Selb and A. J. Snow; Hon. Secretary, A. T. Mole; Committee, H. J. Brown, W. C. Watson, J. Walker, S. Stanley, W. H. Brown; American Div. Secretary, W. C. Marley, New York, U.S.A. Hon. Secretary: Mr. A. T. Mole, 39, Westbere Road, W. Hampstead, London, N.W.2.

Tribunal Appeals.—In view of the need for photographers for the R.A.F., the National Service representative at Bath brought up for review the conditional certificate held by Herbert Richard Lambert, 34 (Grade 3), 32, Milsom Street, photographer, which was granted in September, 1916. After a private hearing, the National Service representative's application was dismissed; the exemption, therefore, stands.

At Hayward's Heath, a photographer, 31 (Grade 2), came under review, Sir John Blaker stating that his application was under general instructions. Photographers were very much wanted in the Army, presumably for aeroplane work. Judging from the man's healthy appearance, he did not think he was fitted for air work. The respondent said he suffered with his heart, and he thought flying would greatly affect it. The chairman said if the man was wanted for military air work, he did not think he would be of much use. The National Service application was refused.

British Industries Fair, 1919.—For next year's British Industries Fair the Board of Trade have again been able to secure from the Port of London Authority the great warehouses in Pennington Street, which proved so highly satisfactory for the fair held at the beginning of this year. The fair will open as usual on the last Monday in February (February 24), and will remain open until Friday, March 7. In order in no way to interfere with the production of munitions, the fair will again be restricted to the same trades which have participated in the last three fairs, namely :—Glass and pottery, paper, printing and stationery, fancy goods, toys.

As in past years, the invitations to visitors to the fair will be issued by the Board of Trade, and admittance will be restricted to bona-fide buyers interested in the above trades.

Over 2,000 forms of application for space have already been issued to manufacturers in the trades concerned, and it is expected that the number of firms anxious to participate will be considerably in advance of last year, when orders to the value of over a million and a half were placed. Eligible manufacturers who have not received application forms should, if they wish to participate, communicate at once with the Director, British Industries Fair, Board of Trade, 10, Basinghall Street, London, E.C.2.

Correspondence.

- *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*
- *We do not undertake responsibility for the opinions expressed by our correspondents.*

CHEMICAL POISONING.

To the Editors.

Gentlemen,—Noticing in last week's "B.J." correspondence, relating to chemical poisoning, if this gentleman will send me his address I will send him enough Ujah ointment to cure his friend, who is such a sufferer, free of charge. I will also extend this offer to any other readers of the "B.J." who are really suffering from metol or amidol poisoning in a very bad form. I have been through the mill myself and know the terrors and pain, having been a sufferer for nearly eight years. All the doctors and chemists I went to could give me but little relief. I also attended hospitals for months as out patient until I was nearly driven to despair. Now I have been entirely free from this dreadful malady for nearly two years. Any case that comes to my notice that I consider is anything like my own was I always do my very best for, I do not mind who it is; if they have no faith to purchase a jar it makes no difference, for I was just the same, trying every prescription and all other things until I had no hopes of ever being well again and was nearly driven to despair (hands, arms, face and neck all being affected) through the pain at night as well as day. I can assure you this is just a thanksgiving offering for my wonderful return to health.—Yours faithfully, E. Leach.

Ujah Ointment Co.,
18, Clarendon Street, Oxford.

LATENT IMAGES IN GLASS.

To the Editors.

Gentlemen,—In the northern portions of this State the sunlight, especially during the summer months, is extremely intense, the sun temperatures exceeding 160 deg. F. The fragments of domestic "white" glass from sugar bowls, cruets, and so on, to be found at the sites of old railway construction camps exhibit in a very marked degree the well-known amethystine tint caused by the action of light upon the manganese employed by the glass-makers to oxidise the green ferrous compounds to the ferric and less visible state. The powerful sunlight evidently carries the action a stage further, probably reducing the iron to some extent, and thereby liberating a more highly-coloured manganese compound. In the case of a photographic negative, it appears to me probable that the silver image carries a static charge sufficient to bring about a molecular change in the ferrous glass content proportionate to the density of the image, and this action would likely be either brought about or intensified by the action of sunlight in printing out, and, if so, latent images would be more likely to occur in negative glasses of some years ago.

Another variety of latent image came under my notice recently upon the occasion of a slight frost, when the window-pane of the room became slightly clouded over by moisture. I was surprised to notice some lettering on the window, and was able to decipher a "To Let" notice which must have been written not less than twenty-five years ago, in whiting and water. No trace of it could be distinguished when the glass became dry. The window must have been cleaned many times during the interval, but it is possible that some trace of greasy matter may have been present in the whiting. It seems more likely, however, that the reflection of the morning sunlight from the whitened back of the glass has effected local molecular changes.

If the above theory be correct, the remedy would lie in bringing the whole unstable content of the glass into the same molecular condition, either by exposure to sunlight, violet rays, cathode, or other available rays.—I remain, Gentlemen, yours faithfully,

J. H. M. Davidson.

Engineer-in-Chief's Office, Adelaide, South Australia,
August 27, 1918.

MATTERS OF PROFESSIONAL MOMENT.

To the Editors.

Gentlemen,—It is evident that Edinburgh has a real live Society. After reading your report of the Presidential address it strikes one that there is a future for professional photography.

Mr. Young's ideas are well worth consideration; take for instance the education of assistants. What a vast improvement there might be in general conditions of employment, if assistants were trained at schools fully competent for the job.

There are, unfortunately, studios where an educated assistant would scarcely be welcomed; places too old fashioned—and some too unfashioned—to tolerate modern science, but these are the minority. Most master photographers will agree that competent assistance is a boon.

The Edinburgh President goes further when he speaks of inviting assistants to masters' meetings; but here again he is on a good track, for though a few owners might not condescend to meet with their employees—and some employees would not go within miles of their masters outside working hours—still if the photographers of the United Kingdom were a *fraternity*, irrespective of paying shop rent or working for wages, the fact would raise us above the "union" trades who are at present decidedly above us.

Mr. Young has sounded the warning note about Hun goods, true, he did not propose a boycott, but he mentioned that the matter should be kept in mind. Edinburgh must not be the only patriotic city where professional photographers are concerned.

With regard to an exhibition of professional work, what could be better? "By their works shall ye know them," and if we want to know our bosses or assistants, present or prospective, and if the public want to know all or any of us, then exhibitions are the thing. Of course, rigid rules would have to be made with regard to the actual authorship of work; there are such things as "bought specimens"—and we're not all angels.

If I might offer a humble suggestion to the P.P.A. I should advise them to make the subscription guineas per annum and adopt the Edinburgh programme. I know much bigger men than myself who would join me in immediately soliciting membership.—Yours,

Small Pro.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

T. Bellingstone.—The best book, as we have often said, is "The Science and Practice of Photography," by Chapman Jones.

Jolly Tar.—We have an article in type on the subject to appear within the next week or two. What you say is quite right; as long a focus as you can manage to use.

Lancastrian.—Fix thoroughly in two successive baths and wash as you are doing, and you need have nothing to fear on the score of permanence either of prints or negatives.

Silent Home.—An electric motor of about ⅛ or ¼ h.p. would be ample for your purpose, and the current would, of course, be charged at power rate. Certainly it is a good principle, though it would not supplant all manual turning over of the prints.

Mons Star.—Impossible to prophesy, but we should think the offer is one worth considering provided the price is not much more than one based on pre-war cost of apparatus and present value of materials. Goodwill obviously cannot count for anything in such a case.

W. B. E.—There is no reason to doubt the *bonâ fides*. There are, no doubt, still a good many of the instruments in photographers' hands despite the Government requisition two or so years ago. If you wish to assure yourself you could have it tested at the National Physical Laboratory.

H. D.—If you are proposing to start a retail business at premises not hitherto used by you for such a business, the terms of the Order are that you must make application for a licence, and for your district it will be to the Director of National Service, Technical College, Cardiff.

C. W. Mather.—If no further particulars than those you cite can be disclosed, we should regard the whole affair with great suspicion. There have been so many inventions for this purpose that it is difficult to believe another one can be very different, or, if it is different, of any value as an investment.

J. G.—If you will write to the General Electric Company, 67, Queen Victoria Street, London, E.C., they will send you an illustrated pamphlet, giving prices and sketches of various installations. If you do not adopt this, an enclosed arc lamp, such as the Westminster or Jandus, will answer very well. It should be placed inside a shade made of two hoops, each about 24 ins. in diameter and 30 ins. apart, two-thirds of the space being covered with opaque card, lined white, and the remainder with tracing cloth.

Chas. Watson.—The mountant you have in mind is evidently similar to one prescribed by Mr. Harold Baker as follows:—Soak about half a pound of best glue in cold water for 10 or 12 hours until thoroughly soaked. The water is drained off, and the vessel containing the glue put in a saucepan of hot water. When melted, methylated spirit is poured in very slowly, with constant stirring, until the mixture is about as thick as milk. If the spirit is added too quickly it will take up the water from the glue and send it to the bottom as a lump of jelly, but persistent stirring while hot will mix it up again. When used, it must be kept hot and spread over the dry prints with a stiff brush, going over the edges the last thing before laying on the mount, which should be marked where the print is to go.

Asphalt Varnish.—I have tried to make asphalt varnish according to receipt in "B.J. Almanac." The asphalt dissolves in naphtha, but I have tried to get some bits of cycle rubber air tubing to dissolve in it, but have not been successful. Is the rubber tubing not suitable, or is there a process necessary to make it dissolve? If it is a composition, which is unsuitable, would you please tell me what kind of rubber I require, where it is likely to be purchased, and the price? Also, I should like to know how to proceed to dissolve it. Is it necessary to heat it, or will the rubber dissolve of itself if left in the naphtha?—Oro.

Your failure is caused by the fact that the vulcanised rubber you have used will not dissolve in naphtha. You want unvulcanised rubber, such as you can most conveniently buy in the form of one or other of the various stopping preparations sold for filling cuts in motor tyre covers, and consisting mainly of unvulcanised or partially vulcanised rubber. Using this material, it is necessary to use only gentle heat in employing the naphtha solvent.

Studio Construction.—I am building a studio, 20 by 10, but can only get 20 ft. length (two walls), other people's property. 20 by 10 ft., is a larger one than the one I am using at the present. I intend to build all one side with iron roof half 9 ft., and wood wall; the other side all glass, with 4 ft. roof sharp. Is there any danger of my getting too much light on the sitter? Studio to be lined inside with strong canvas and whitened all over with the usual whitewash. I think, by the sitter facing east-south-west, I shall be able to get a good portrait with a quick exposure. Must I have 3 ft. near the sitter on glass side boards, or sheet iron, to make it dark behind for background?—W. S.

We do not think that there is any danger of getting too much light with the construction you suggest, but we certainly do not approve of whitewashing all the inside, especially in such a narrow studio. It will be better to distemper your walls a grey or greyish-green, otherwise you will get very flat negatives. It is advisable to have three or four feet dark at each end, and this may as well be covered with wood or iron as with glass and dark blinds.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully and correctly prepaid, senders of line announcements are asked to bear in mind this revised tariff. They will thus save themselves delay in the publication of their announcements.

Net Prepaid Line Advertisements.
Increased Tariff of Charges.

12 words or less	1/-
Extra words	1d. per word.

(No reduction for a series.)

Special Note. Adv'ts under a Box Number.

"Box No." and office address	charged as 6 words.
For forwarding replies add ...	6d. per insertion for each adv't.

If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

Advertisements are not accepted over the telephone.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH
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SUMMARY

Our publishers ask us to announce that the last day for booking advertisement space in the forthcoming Almanac is Tuesday next, November 12.

At the present season it is necessary to make the best use of such daylight as we can get. In an article on page 498 we give some hints for doing so.

The position of assistants in relation to the Professional Photographers' Association and other matters of professional moment find place in "Correspondence" on page 506.

A cheap method of toning and fixing P.O.P. prints without the use of gold, if permanency is not essential, is detailed on page 504.

The lighting in portraits of elderly sitters, so as to obviate the necessity for excessive retouching, together with hints on posing and style of pictures, is the subject of a note on page 503.

Old photographers will regret to hear of the death of Mr. R. C. Murray, who had a lifelong connection with the photographic [illegible] trade. (P. 506.)

At the last meeting of the Royal Photographic Society Mr. A. J. Bull gave a lecture on the use of colour-sensitive plates, in which he laid special emphasis on the enormous strides which had been made in the manufacture of panchromatic plates in recent years. (P. 504.)

A theory as to the appearance of ghostly images on twice-used glass is put forward in a letter on page 507.

The importance of accurate correspondence of view angle between the finder and lens of a hand-camera is often not realised until a valuable exposure is lost. We detail a method of making the necessary adjustment. (P. 497.)

A very practical communication on the preparation and use of the iodide of mercury intensifier appears on page 503.

Some interesting revelations regarding composition of developing agents, notably metol "substitutes," with instructions for qualitative and quantitative analysis, appear on page 499.

A correspondent sends us a hint as to securing even toning of bromide prints by the sulphide process. (P. 498.)

The utility of potass iodide for producing soft bromide prints from harsh negatives does not seem to be readily recognised in this country. We refer to it in a paragraph on page 497.

Lens matters, the preparation of developers, studio construction, and softening hard negatives are the principal items in "Answers to Correspondents." (P. 508.)

The value of the telephoto lens to the commercial photographer for securing inaccessible architectural details or well proportioned images of small objects for catalogue work is pointed on page 498

EX CATHEDRA.

Doped Developer. The lengthy paper by Dr. H. T. Clarke, of the Eastman Research Laboratory, which is printed elsewhere in this issue, will be found to contain an item corresponding with a piece of developer knowledge which perhaps is not generally recognised. It will be noted that among the examples of sophisticated developing preparations is one (issued as of metol properties) consisting largely of hydroquinone. As a means of doctoring this cheap but contrast-giving reagent in order to cause it to simulate the soft-working methyl developers, admixture with iodide of potassium was resorted to. The fraud is not without its useful significance. Iodide has a distinct softening effect upon the action of many developers, though its use in this direction is restricted by its equally positive effect upon the colour of the developed prints. Nevertheless, in circumstances which make the expedient desirable, cautious addition of a little 10 per cent. solution of potass or sodium iodide may be kept in mind as a useful means of obtaining softness with a developer which, without this addition, would yield prints running unduly to contrast.

* * *

Lens-Angle and View Finder. Those who do much hand-camera work will not be long in finding out that the view-finder is, on the whole, the most unsatisfactory item of their equipment. The best pattern is undoubtedly the wire frame, fitted with cross lines and a back sight, enabling the instrument to be used at eye level. One point, however, that is apt to be overlooked by operators is that a change of lens often has the effect of entirely upsetting the most carefully adjusted view-finder. The other day we met a press operator who had failed in obtaining a series of negatives at a sports meeting owing to the fact that the lens on the camera had been changed at the last moment for one of a different focus, and including a much narrower angle. The finder worked very well in conjunction with the original lens, but was, of course, inaccurate with the newer one. It is important when changing lenses as above, when the instrument is in a focusing mount and a direct vision-finder is in use, to make a rapid test as to what is included by the lens and what is indicated by the finder. For this purpose one may fix up four pieces of black cardboard to include a rectangle of the same scale as the plate in use upon a whitewashed wall. The camera is then set up about a couple of yards away and the black cards got in the four corners of the screen; a glance at the finder will at once show whether approximately the same result has taken place. As a general rule the finder will be found to include far too much, and may be modified to suit the lens by painting out all surplus with a little Brunswick black, or in the case of a wire-frame finder another couple of wires may be temporarily added. Thus, if accuracy is obtained in the relation between these two important items in his equipment at such a short distance, the operator will have no fear about including longer distances. In the case of a box-form finder a similar comparison may be made.

* * *

Uneven Sulphide Toning. In reference to our recent note in this column on unevenness in sulphide toning, a manufacturer writes us giving his experience of his own and other makers' papers. As a result of dealing with customers' complaints, it is found that parts of the image occasionally refuse to bleach in the ferricyanide-bromide solution. In some cases this refusal occurs in patches, but more frequently in spots. Also this behaviour is found to differ in respect to the fact that in some cases the parts are totally unaffected whilst in others they are only partly halogenised. Whichever of these forms of defect is encountered the result is, of course, unevenness in the sulphide-toned prints to a greater or less degree. For this evil, according to our correspondent, a remedy—or rather a preventive—exists in the addition to the bleaching solution of a little liquor ammonia, about one drop per ounce of bleacher. With this modification it is found that prints bleach perfectly and yield even tones after sulphiding. The suggestion, which we pass on to our readers who have had trouble of this kind, is certainly in accordance with the experience that ammonia and some other alkalies have the property of energising the bleaching action of a ferricyanide-bromide solution.

* * *

Commercial Telephotographs. It is a very common and not wholly unjustified criticism of the telephoto lens, as regards its practical usefulness, that the subject which displays its utility has to be sought with patience; that the results are more often demonstrative of what the lens will achieve than an example of its power to meet demands upon it. In one application, at any rate, this is not the case, and the exception may usefully be drawn to the notice of commercial photographers, by few of whom perhaps a telephoto lens is regarded as a useful item of their equipment. But in photographing small objects natural size, or nearly natural size, a telephoto is of special usefulness, for the reason that it compels a very considerable distance between lens and camera, and therefore ensures in the photograph the quality of "good drawing," which is an essential in such work. Five or six feet is none too great a distance in such cases, but a 30-in. or a 36-in. lens of the ordinary type is a bulky instrument, even if it is available. A telephoto of the adjustable focus type, such as the Adon, yields very satisfactory results while adding only a few ounces to the weight of the kit.

* * *

Fitting a Filter. The other day we wished to employ a colour screen which was invariably used on a camera having a much larger lens hood, in conjunction with a smaller-sized instrument. There was about half an inch to spare between the cell in which the filter was mounted and the lens of the camera, and, of course, as was usual in such cases, the work had to be done in a hurry. The space was to be filled up somehow, and was too large to allow of a former plan being adopted—*i.e.*, that of winding coarse knitting wool round and round the lens until a good fit was obtained; so another way had to be sought. The difficulty was eventually solved in the following simple manner:—An old photographic friend was at hand in the form of "Plasticine." Two small lumps of this were taken, about the size of large hazel nuts, and wrapped separately in two small pieces of grease-proof paper, in order to avoid soiling the lens mount or filter. The two were then fixed lightly on the lens mount, and the filter in its cell gently forced over. In this way a good and firm fit was obtained. This plan has also been used with success for attaching a lens shade in the same way. Though simple in use, the filter or shade is held as firmly as when an adjustable mount is employed, and the plan also has the advantage of enabling one screen to be used with several lenses, thus saving expense.

WINTER LIGHT.

As the days grow shorter, the light available for portraiture declines more rapidly in proportion to the time that the sun is above the horizon than it does during the summer months, and the photographer finds his working time all too short for what has to be done. There is in most cases an opportunity of using some form of artificial light, but even where this is installed there is always a temptation to work up to the last possible moment before switching it on. There are also very many studios where no artificial light but the magnesium flash is available, so that the photographer has to make the best of what daylight there is, and therefore cannot afford to miss any means of getting pictures for which he will not have to apologise. It will generally be found that the actual lighting is not so much at fault if sufficient exposure can be given. Thus, the first problem to be solved is to make sure of the lighting as it exists. As a commencement we must see that what light is used is as pure in colour as the circumstances permit, and to this end the glass of the studio, the white blinds, head screens and reflectors are perfectly cleaned; also that the glass is not actually discoloured by exposure to light and a smoky atmosphere. It would surprise most people to see the difference in colour between a sheet of glass taken from a window after ten years' service and a new sample of the same quality. The difference can usually be seen between the centre of the pane and the margins which have been protected by putty. Ground glass (besides this particular form of deterioration) suffers from a disinclination to give up all the carbon deposited on its rough surface by any method of cleaning which can be applied to it *in situ*. Perhaps the best cleaning material for all studio glass is one of the polishing soaps of the Monkey Brand or Sapolio type. This serves the purpose of the old tripoli and ammonia cleaner, of which wet plate workers know the efficacy. It should be remembered that in large towns the smoky atmosphere deposits a thin film of tar upon the glass, and this is difficult to remove with water alone. Hence the use of petroleum by many professional window cleaners.

Next to the glass itself, the white blinds or curtains demand attention. These are often left so long unwashed that they are practically brown, and stop out almost as much actinic light as the dark ones, giving little or no diffusion. In studios where festoon curtains are fitted, it is a good plan to have a second set, thinner than the ordinary, for winter use, which can be put up clean when the light begins to weaken. The same course can be followed with the circular head screens generally used. With regard to the lighting of the sitter, a much larger expanse of glass may be uncovered than is permissible in a good light; in fact, at the camera end the top and side lights may be quite open. The sitter is placed only as far under the blinds at the other end as may be necessary to secure modelling. Of course, only plain lighting should be used: "Rembrandts" or other fancy effects should not be attempted except in a good light.

Most portrait photographers use as rapid plates as they can get, but those who are in the habit of using them of a speed of about 200 H. and D. should remember that there are brands nearly twice as fast and still capable of giving good plucky negatives. Iso plates are slightly quicker in a yellowish light than ordinary ones marked with the same speed number. One of the pitfalls in winter work is the use of a positively warm developer. This often tends to give the hardness which it is desired to avoid. In this, as in most other things, the middle course is the safe one, the best results being obtained with a temperature not exceeding 70 degrees Fahrenheit. Another mistake is the use of a strong solution. This again tends to contrast, as does prolonged development. Many under-exposed plates are spoiled by developing for shadow detail when none is present. The consequence is that all the detail in the high-lights is lost, and the result is a print in two gradations or "soot and whitewash." The best way to warm the developer is to warm the dark-room, and a convenient way of doing this is to place a small oil stove or electric radiator below the sink, so that this shall be the warmest spot in the room. If the solution be warmed and used in a cold room, it soon cools to the surrounding temperature and becomes less active. Herein is one of the advantages of tank development, as we have a larger body of solution to deal with and, moreover, can readily use a thermometer while developing to see that an even temperature is maintained. Some developers are more susceptible to variations in temperature than others. Hydroquinone, for example, is almost inert at 40 degrees Fahr., and will then only yield a faint image upon a fully exposed plate.

One of the best ways to utilise a poor light is to get plenty of it through the lens. Rapid plates have led to a practice of using needlessly small apertures. These, of course, give depth and make focussing easy, but in the winter should be avoided. In the old days people used *f*/4 lenses, because they could not get full exposures with smaller apertures except in the best of light, and they had to learn how to get the best possible definition at this aperture. This is a matter calling for good artistic judgment and considerable practice with the particular lens in use. Many lenses have a slight chromatic error, which is not noticed at *f*/6, but which gives an appearance of want of depth in the negative with a larger aperture, the reason for this being that after the operator has carefully chosen a point which would give good average definition throughout the picture he finds that the lens has rendered this point less sharp than another, so that all his careful adjustment is wasted. If this peculiarity is recognised, it is easy to allow for it in focussing, and this many of the old operators used to do without knowing why they did so.

In one poorly lighted studio which we call to mind the operator was driven in winter to reinforce his lighting by means of a large cheval glass, which he placed at different points in the studio with great skill. His plan was to admit as much light as possible, even to the point of general flatness, and then to put in the dominant light with the mirror. In the case of studios which have the walls of rather a dark tint, light draperies hung over them, or a large white background judiciously placed will greatly improve the general illumination without giving a decidedly "reflector" effect.

Although these hints apply to working in all kinds of poor light, they will be more applicable to dull days than to a rapidly fading light. After three in the afternoon at this date every minute makes a considerable difference in exposure, and soon no dodges are available. Then we must either turn on the current or make appointments for another day.

EXAMINATION OF ORGANIC DEVELOPING AGENTS.

(A Communication from the Research Laboratory of the Eastman Kodak Company.)

From the time that the European war cut off the supply of foreign organic chemicals to this country two distinct activities have been apparent in the photographic developing agent trade; on the one hand, the efforts of manufacturing concerns to produce the most necessary substances, like hydroquinone and salts of p-aminophenol, and on the other the less commendable manipulations of the purveyors of bogus and adulterated developing agents. For the control of both these activities chemists are necessary—to check the purity of the genuine products and expose the composition of the false. Moreover, in many cases developing agents are submitted under fancy names, and it is necessary to identify the substances they contain.

The work of the analyst thus falls into three classes—the separation and identification of genuine developing agents, the quantitative determination of such substances, and the identification of the materials employed for adulteration or substitution.

The following scheme for the identification of the commoner developing agents is drawn up to meet the first; a few suggestions for quantitative work follow; but owing to the enormous number and variety of adulterants no attempt can be made to indicate all of the methods employed for their detection and estimation, which in any case are subject to the methods of routine analysis.

Qualitative Methods—Group Tests.

Taking 0.1 gm. of sample—

I.—Insoluble in 5 ccs. of cold water.
  p-Hydroxyphenylglycine.

II.—Soluble in 5 ccs. of ether.
  Hydroquinone.
  Chlorohydroquinone.
  Catechol.
  Pyrogallol.

III.—Soluble in 5 ccs. of alcohol:
  p-Aminophenol base.
  p-Aminophenol hydrochloride.
  5-Amino-2-cresol hydrochloride.
  2.4-Diaminophenol hydrochloride.
  p-Dimethylaminophenol oxalate.

IIIa.—Insoluble in alcohol:
  p-Aminophenol sulphate.
  5-Amino-2-cresol sulphate.
  p-Methylaminophenol sulphate.
  p-Dimethylaminophenol sulphate.
  o-Methylaminophenol sulphate.
  p-Phenylenediamine hydrochloride.

Qualitative Methods—Distinguishing Tests.

A.—Test aqueous solutions with litmus:

Neutral or only faintly acid, Group II., Groups III. and IIIa give markedly acid solutions (with the exception of pure p-aminophenol base). Test aqueous solutions for chloride, sulphate, oxalate and other common anions.

B.—Treat 0.1 *gm. in* 1 *cc. hot water, with one or two drops of* 10 *per cent. sodium carbonate solution; let mixture stand a few minutes to cool:*

Group I.—p-Hydroxyphenylglycine. Dissolves with effervescence; very little change on standing.

Group II.—Hydroquinone, Chlorohydroquinone, and Catechol. No effervescence; solution darkens slowly on standing.

Pyrogallol. No effervescence; solution darkens rapidly on standing.

Groups III. and IIIa.—All cause effervescence except pure p-aminophenol base.

Crystalline precipitates formed on cooling; salts of p-aminophenol, 5-amino, 2-cresol and o-methylaminophenol.

No precipitate on cooling; salts of 2.4-diaminophenol, p-methylaminophenol, p-dimethylaminophenol, and p-phenylenediamine.

C.—To 0.1 *gm. of sample in* 2 *cc. of water add a few drops of* 10 *per cent. ferric chloride solution:*

Group I.—p-Hydroxyphenylglycine gives no colour reaction in the cold; odour of quinone on boiling.

Group II.—Hydroquinone gives dark greenish precipitate of quinhydrone in the cold; strong odour of quinone on boiling.

Chlorohydroquinone gives reddish-brown colouration in the cold; odour resembling that of quinone on boiling.

Catechol gives a green colouration with one drop of ferric chloride; with excess, a nearly black precipitate is formed; no odour is produced on boiling.

Pyrogallol gives intense reddish-brown colouration in the cold; no odour on boiling.

Groups III. and IIIa.—Salts of p-aminophenol and 5-amino-2 cresol give purple colourations in the cold; odours of quinone on boiling, and the purple colours are not destroyed.

p-Methylaminophenol sulphate behaves similarly, except that the purple colouration is developed more slowly.

Salts of p-Dimethylaminophenol give no colour in the cold; the solution darkens on boiling, with formation of quinone odour.

With 2.4-Diaminophenol hydrochloride an intense red colour is developed in the cold; no odour is produced on boiling.

With o-Methylaminophenol sulphate a dark purple colour is produced, turning to red-brown on standing, or more rapidly on warming; no odour is produced on boiling.

With p-Phenylenediamine hydrochloride a deep green colour is developed, followed immediately by a dull purple; on boiling the colour changes to a dull reddish-brown, and the odour of quinone is produced.

D.—To 0.1 *gm. of sample in* 1 *cc. of water. add* 2 *ccs. of* 5 *per cent. silver nitrate solution:*

Group I.—p-Hydroxyphenylglycine in suspension causes a black deposit in the cold, which on boiling instantly becomes light brown, while the liquid rapidly acquires a purple colour.

Group II.—Hydroquinone gives a silky white precipitate in the cold, the odour of quinone is developed on boiling.

Chlorohydroquinone scarcely reduces silver nitrate in the cold, but rapidly on boiling.

Catechol slowly reduces the reagent in the cold; no characteristic colour or odour developed on boiling.

Pyrogallol causes instant reduction in the cold, giving a brown precipitate; no odour produced on boiling.

Groups III. and IIIa.—Salts of p-aminophenol, p-methylaminophenol, and 5-amino-2-cresol give purple colourations, with quinone-like odours on boiling.

Salts of p-dimethylaminophenol give no colour in the cold; on boiling a brownish red colour and the odour of quinone are developed.

2.4 diaminophenol hydrochloride yields an intense red colour; no odour on boiling.

o-Methylaminophenol sulphate gives a yellowish-brown colour in the cold, becoming reddish brown on heating; no odour developed on boiling.

p-Phenylene diamine-hydrochloride yields in the cold a transitory pale green colour, followed instantly by a deep purple; no colour change and no odour on boiling.

Specific Tests.

Two reactions which should be performed with every developing agent are acetylation and benzoylation.

In acetylation the substance is mixed with about three times its weight of acetic anhydride, together, if the developing agent be a salt of a base, with an equal weight of anhydrous sodium acetate, and the mixture gently boiled for a few instants over a flame. After the mass has cooled about ten volumes of water are added, and the separated solid filtered off and recrystallised from alcohol or similar solvent.

In benzoylation (Schotten-Baumann process) the substance is mixed with about four times its weight of benzoyl chloride, and an excess of 10 per cent. caustic soda solution added, whereupon the mixture is vigorously shaken in a stoppered tube, cooling if necessary, and occasionally releasing any excess pressure by opening the stopper. Shaking must be continued until the irritating odour of the benzoyl chloride has disappeared. Care must be taken that an excess of alkali is present at the end of the reaction. The separated solid is then filtered off, washed with water, and re-crystallised from acetone or other suitable solvent.

The derivatives thus produced possess characteristic melting points, so that an identification can be definitely established by their aid.

The following are specific properties of the developing substances and of their acetyl, benzoyl, and other derivatives:—

Group I.—p-Hydroxyphenylglycine dissolves readily in dilute sodium carbonate, sodium hydroxide, sodium sulphite, or ammonia; also in dilute mineral acids, but not in dilute acetic acid. When pure it crystallises in colourless leaflets, melting indistinctly with decomposition above 200°.

Group II.—The four substances described in this group all form bright yellow water-soluble compounds with sulphurous acid (or sodium bisulphite and dilute acid).

Hydroquinone crystallises readily from water in colourless needles melting at 169 degs. It boils at 285 degs. The vapour is almost odourless. It is insoluble in benzene. Quinhydrone, precipitated by a cold acid solution of ferric chloride, or of potassium bichromate, melts at 171 degs. Quinone formed by the action of an excess of acid bichromate melts at 116 degs. The diacetyl derivative melts at 123 degs.; the dibenzoyl derivative melts at 199 degs.

Chlorohydroquinone is too soluble in water to crystallise from aqueous solution. It dissolves readily in warm benzene. It melts at 106 degs. and boils at 263 degs. The vapour has a distinct phenolic odour The diacetyl derivative melts at 99 degs. Chloroquinone produced by oxidizing with acid bichromate melts at 57 degs.

Catechol forms feathery needles which melt at 104 degs. and boil at 245 degs., and are extremely soluble in water. It is readily soluble in hot benzene, sparingly in cold It possesses an odour resembling that of pyrogallol. On treatment with bromine in carbon tetrachloride solution, hydrogen bromide is evolved, and a tetrabromo derivative melting at 192 degs. is produced. The diacetyl derivative melts at 63 degs.; the dibenzoyl derivative melts at 84 degs.

Pyrogallol is extremely soluble in water. It is slightly soluble in hot benzene, almost insoluble in cold. It melts at 133 degs. and boils at 293 degs. It possesses a peculiar and characteristic odour. Its aqueous solution gives a blue precipitate with ferrous sulphate. The triacetyl derivative melts at 161 degs., the tribenzoyl derivative melts at 89 degs.

Groups III. and IIIa.—p-Aminophenol and its salts. The free base crystallises from water in leaflets, melting with decomposition at 184 degs., soluble in about 100 parts of cold water. It is moderately soluble in hot alcohol, sparingly in ether. The hydrochloride crystallises in prisms, and is sparingly soluble in concentrated hydrochloric acid. The sulphate, crystallising in fine needles, is less soluble in cold water than the hydrochloride, but the hydrochloride is precipitated from an aqueous solution of the sulphate on adding concentrated hydrochloric acid. On adding to a cold slightly acid solution an excess of sodium acetate and then a few drops of benzaldehyde, the pale yellow benzylidene derivative is soon precipitated, which crystallises from methyl alcohol in needles melting at 183 degs. The diacetyl derivative melts at 150 degs.; the dibenzoyl derivative melts at 234 degs.

5-Amine-2-cresol and its salts resemble p-aminophenol and its corresponding salts very closely in solubility and chemical behaviour. The free base crystallizes from water in flat needles melting with decomposition at 176 degs. The hydrochloride crystallizes either in needles, or, less frequently, in leaflets. The sulphate crystallizes in fine needles. On oxidation with acid bichromate it yields toluquinone, melting at 68 degs. The benzylidene derivative is markedly less soluble than benzylidene-p-aminophenol in methyl alcohol, from which it crystallizes in leaflets melting at 208 degs. The diacetyl derivative melts at 103 degs.; on gentle hydrolysis with alkali it yields the monoacetyl derivative, melting at 179 degs. The dibenzoyl derivative melts at 194 degs.

2:4 Diaminophenol is met with only as the hydrochloride. The free base is not precipitated from solution on addition of sodium carbonate; the neutralised solution darkens very rapidly in air. The hydrochloride is sparingly soluble in concentrated hydrochloric acid. Attempts to prepare a benzylidene derivative lead to a smeary yellow product. The triacetyl derivative melts at 130 degs.; the tribenzoyl derivative melts at 231 degs.

p-Methylaminophenol is met with only as the sulphate, which crystallizes in fine needles. The free base is fairly readily soluble in cold water, but can be obtained on neutralising a cold saturated solution of the sulphate with sodium carbonate; it melts at 85 degs., and is extremely soluble in ether. On allowing a solution in an excess of sodium hydroxide to stand in air, a dark colour rapidly develops, accompanied by a characteristic odour not unlike that of a trace of pyridine. On adding sodium nitrite solution in slight excess to a solution acidified with sulphuric acid, the sparingly soluble nitroso derivative separates in colourless needles melting at [illegible] degs. The perfectly pure monomethyl compound yields no benzylidene derivative on treatment with sodium acetate and benzaldehyde, but technical samples are rarely entirely free from salts of p-aminophenol, which is converted by benzaldehyde into the insoluble benzylidene-p-aminophenol. A good technical sample should be completely soluble in three parts of concentrated hydrochloric acid. The diacetyl derivative is insoluble in cold water, and melts at 97 degs.; on gentle hydrolysis by warming with dilute alkali, this is converted into the mono-acetyl compound soluble in alkali and precipitated by acid, which melts at 240 degs. The dibenzoyl derivative melts at 173 degs.

[illegible]. The sulphate crystallizes in hexagonal tablets, which are extremely soluble in water. The oxalate is moderately soluble in water and alcohol; it melts at 187 to 191 degs. The free base is fairly readily soluble in cold water; it melts at [illegible] degs., and is extremely soluble in ether. On allowing a solution in sodium hydroxide to stand in air, the same dark colour and pyridine-like odour are developed as with the monomethyl compound. On adding sodium nitrite to a solution in dilute acid, a reddish-brown coloration is formed, with evolution of gas. On adding a saturated solution of potassium ferrocyanide to a fairly concentrated solution in dilute sulphuric acid, a white crystalline precipitate of the acid ferrocyanide soon separates. It forms an acetyl derivative melting at [illegible] degs., and a benzoyl derivative, soluble in dilute acids, which melts at [illegible] degs.

[illegible]. The sulphate crystallizes in short prisms, which are extremely soluble in water; the free base, which is slightly soluble in cold water, but readily so in hot water, crystallizes in leaflets melting at [illegible] degs. It dissolves in alkali, forming a solution which slowly darkens to a dull green colour on standing in air, giving a pyridine-like odour, but more slowly than the para compound. The free base and its sulphate are completely soluble in three parts of concentrated hydrochloric acid. On adding sodium nitrite to a solution in dilute acid, the nitroso compound is precipitated in colourless leaflets, which melt with decomposition about [illegible] degs. after darkening from [illegible] degs. onwards (the melting point is rather indistinct, and depends upon the rapidity with which the heat is applied). The derivative obtained on acetylation is a liquid which dissolves in cold water; on gentle hydrolysis, by warming with dilute alkali, it yields the monoacetyl compound soluble in alkali and precipitated by acid, which melts at 150 degs. The dibenzoyl derivative melts at 113 degs.

p-Phenylenediamine. The hydrochloride crystallizes in leaflets, which are readily soluble in water. The free base, melting at 140 degs., is moderately soluble in cold water and sparingly in ether. On adding to a cold dilute solution an excess of sodium acetate, and then a few drops of benzaldehyde, the pale yellow dibenzylidene derivative is precipitated; this crystallizes from methyl alcohol, in which it forms a bright yellow solution, in thin leaflets melting at [illegible] degs. Both the diacetyl and dibenzoyl derivatives melt at temperature too high for convenient measurement.

Quantitative Methods.

It frequently happens that photographic developers placed upon the market consist of mixtures of developing agents or of impure simple substances, so that it may be necessary to separate and estimate the constituents of a mixture or to determine the purity of a sample of a single substance.

Group I.—No direct method for determining the purity of a sample of p-hydroxy-phenylglycine is available. An ash determination should be made, and the amount of matter insoluble in dilute sodium carbonate estimated. If a sulphite be present, the sulphurous acid liberated by mineral acid should be determined by the method indicated below.

Group II.—All the substances in this group should leave no ash on ignition; if there be any, it should be estimated. Likewise, all should dissolve in water and in ether without residue, and should leave no considerable residue when the main constituent is volatilised under atmospheric or reduced pressure.

The melting point forms a fairly satisfactory criterion of the purity when the sample is found to be completely soluble in ether.

The proportion of hydroquinone in a sample of chlorohydroquinone may be estimated by isolating and weighing the matter insoluble in warm benzene.

Group III. and *IIIa.*—Water-insoluble material and ash should be estimated; in Group III. the amount of matter insoluble in alcohol should also be determined. The proportion of chloride, sulphate, sulphite, etc., should be determined; and in certain cases it may be well to estimate the total nitrogen by the Kjeldahl method, making certain, of course, that free ammonium salts are absent.

It is important in all cases to determine the amount of salts of p-aminophenol or aminocresol present, both in samples consisting principally of one of these compounds and in samples of methylated derivatives. The procedure is as follows:—Ten grams of the sample are dissolved in about 150 ccs. of cold water (or, in the case of the free base, dilute hydrochloric acid). Heating must be avoided, since this may cause impurities to enter into solution which do not again separate on cooling. A slight excess of sodium acetate is then added, and to the cold solution about 10 ccs. of benzaldehyde are run in. When the sample contains a relatively small proportion of aminophenol, as in samples of p-methylaminophenol sulphate, the amount of benzaldehyde should be considerably reduced. After standing overnight the mixture, which should still contain excess of benzaldehyde, is filtered by suction, and the solid well washed with water, dried in the steam oven, and weighed. A Gooch crucible answers satisfactorily.

The following factors are applied for expressing the result:—

As p-aminophenol hydrochloride	0.738
As p-aminophenol sulphate	0.802
As p-aminophenol base	0.554
As 5-amino-2-cresol hydrochloride	0.756
As 5-amino-2-cresol sulphate	0.815
As 5-amino-2-cresol base	0.584

For the remaining substances in this group the simple though non-specific total nitrogen content must be determined, and the assumption made that all the nitrogen is in the form of the pure substance.

Inorganic Radicles.—When an ash has been found and shown to consist of a salt of an alkali metal, a weighed sample of the substance should be ignited in a platinum crucible, and the residue repeatedly evaporated to dryness and heated to redness after adding a few drops of 20 per cent. sulphuric acid; in this way the metal is completely converted into the sulphate.

Chlorides and bromides should be determined by the Volhard method. Direct estimation of alkali carbonate is difficult, or even impossible in some instances, and may have to be effected by difference.

Sulphites are best estimated by distilling an acidified solution of the sample into alkali and titrating the distillate against standard iodine solution, running the sulphite into the iodine. A regular Kjeldahl distillation apparatus answers well for the purpose.

Typical Analyses.

For obvious reasons the sources of the material used for these typical analyses are not indicated, they represent a selection from a very large number performed in the years 1916-1918.

M.-Q. Developer Tube (*April*, 1916).—The total weight of material in the compartment containing the developing agent was 0.6276 gm. This was placed on a filter and well washed with ether; the ethereal solution, on evaporation, left pure hydroquinone; the insoluble residue, when dried at 100 degs., weighed 0.1241 gm., and was found to consist of pure p-methylaminophenol sulphate. The hydroquinone was not weighed, but estimated by difference.

M.-Q. Developer Tube (*April*, 1916).—A similar analysis on another tube showed total weight 0.5713 gm.; ether-soluble material consisted of pure hydroquinone; ether-insoluble material weighed 0.1120 gm., and consisted of technically pure p-aminophenol hydrochloride.

Developing Agent (*March*, 1916).—The material was a light brown powder of rather moist appearance. It contained no substance soluble in ether, but dissolved partially in alcohol, the alcoholic extract depositing p-aminophenol hydrochloride on evaporation. 2 gms. were boiled with alcohol and filtered on a weighed Gooch crucible. The insoluble residue was well washed with hot alcohol and dried to constant weight in vacuo over sulphuric acid. It weighed 0.728 gm., and consisted of pure starch. The filtrate was evaporated to dryness, and the residue dried at 115 degs.; it weighed 0.998 gm. Another 2 gm. sample was heated in the oven at 115 degs. to constant weight; it lost 0.308 gm.

The material thus consisted of—

p-aminophenol hydrochloride	49.9 per cent.
Starch	36.4 ,, ,,
Moisture	15.4 ,, ,,
	101.7 ,, ,,

"*Metol*" (*April*, 1918).—This consisted of technical p-aminophenol hydrochloride, without a trace of methylated product.

"*Metol*" (*April*, 1918).—The label claimed the contents to be the "Hydrochloride of Methyl-p-ammino-m-cresol, guaranteed 96.3 per cent. pure." The material consisted entirely of 5-amino-2-cresol hydrochloride, without a trace of methylated product.

"*Metol Substitute*" (*April*, 1916).—The material was first extracted with ether; the filtrate was found to contain only pure hydroquinone. 2.7654 gms. gave 0.5122 gm. of hydroquinone, or 18.5 per cent. The residue showed the presence of sulphite and sulphate as the only acid radicles; on ignition a residue consisting of sodium salts was left. p-Methylaminophenol was found by the usual methods, and the behaviour on testing led to the suspicion that cane sugar was present. This was confirmed by boiling with strong hydrochloric acid, when the characteristic brown colour and odour of caramel were developed. Further examination failed to show the presence of other substances.

The portion insoluble in ether was dissolved in water and diluted to 50 ccs.; this solution in a 20 cm. tube gave a rotation of 2.9 degs., using mercury green light, corresponding to 0.932 gm. cane sugar in the sample, or 33.7 per cent.

Another portion of the original sample was ignited in a platinum crucible, and the residue converted into sodium sulphate. 1.3604 gm. gave 0.5319 gm. of sodium sulphate, corresponding to 34.7 per cent. of sodium sulphite. (The sulphurous acid content was not determined as a check.)

For estimating the p-methylaminophenol sulphate a portion was digested with sulphuric acid, and the nitrogen determined by the Kjeldahl process; 1.4880 gm. required 8.6 ccs. of N/10 acid, corresponding to 0.148 gm. p-methylaminophenol sulphate, or 10 per cent. The material thus contained:—

Hydroquinone	18.5 per cent.
Cane sugar	33.7 ,, ,,
Sodium sulphite	34.7 ,, ,,
p-Methylaminophenol sulphate	10.0 ,, ,,
	96.9 ,, ,,

"*Metol Substitute*" (*June*, 1916).—The material on treatment with ether yielded a soluble constituent, which was identified as pyrogallol; the residue, which contained no nitrogenous matter, consisted entirely of sodium sulphite: the ethereal extract from 5.1215 gms. gave on evaporation 1.3050 gm. of pyrogallal, or 25.5 per cent.; the residue was acidified and the sulphurous acid distilled into alkali, which was then diluted to 200 ccs. Of this solution 15.9 ccs. were required by 60 ccs. of standard iodine solution, equivalent to 50.0 gm. sodium sulphite per litre, corresponding to a total of 3.773 gms. sodium sulphite, or 73.8 per cent. Another sample was ignited with sulphuric acid; 1.2730 gm. gave 1.0455 gm. sodium sulphate, corresponding to 0.9280 gm. sodium sulphite, or 72.9 per cent.

The material thus consisted of:—

Pyrogallol	25.5 per cent.
Sodium sulphite	73.4 ,, ,,
	98.9 ,, ,,

Developing Agent (*July*, 1916).—Ether dissolved out a small amount of dark smeary material, which was not further investigated. The residue on further examination was found to consist of impure p-aminophenol hydrochloride mixed with lead chloride and a small amount of lead sulphate. The lead was determined by ignition with sulphuric acid: 1.7130 gm. gave 1.1270 gm. of lead sulphate, or 0.429 equivalents of lead per 100 gms. of sample. In another sample chlorine and nitrogen were determined by collecting in alkali the gases evolved on heating with sulphuric acid in the Kjeldahl process; 1.6070 gms. were heated with 25 ccs. of sulphuric acid, the gases evolved during the early stages of digestion being absorbed in 25 ccs. of 10 per cent. alkali. This was diluted to 100 ccs.; 10 ccs. of the solution required 22.6 ccs. of N/20 silver nitrate after deducting the blank test, corresponding to 0.710 equivalents of chlorine per 100 gms. of sample. The ammonia required 46.4 ccs. of N/10 acid, corresponding to 0.289 equivalents per 100 gms. of sample. Deducting, this leaves 0.421 equivalents of chlorine combined as lead chloride; again deducting, there remain 0.008 equivalents of lead sulphate.

Composition of 100 gms. of sample:—

Impuro p-aminophenol hydrochloride...	0·289 equivalents	or 42·1%
Lead chloride	0·421 ,,	58·5%
Lead sulphate	0·008 ,,	1·2%
		101·8%

The above analysis is, of course, accurate only to about 1 or 2 per cent., especially in the figure for p-aminophenol, since all nitrogenous matter has been calculated as p-aminophenol hydrochloride.

Developing Agent (*September*, 1916).—This material was stated by its label to be "Identical to Metol." On treatment with ether a considerable quantity entered into solution; the ethereal extract, on evaporation, left hydroquinone: 1.2140 gms. gave 0.6300 gm. or 52.0 per cent. of hydroquinone. The insoluble portion was found to contain sulphite, sulphate, carbonate, iodide, sodium, potassium, and a salt of p-methylaminophenol.

Iodine Estimation: 0.8996 gm. gave 0.0613 gm. AgI. Expressed as potassium iodide, 0.0487 gm. or 5.4 per cent.

Sulphite Estimation: 1.2140 gm. required 36.0 ccs. of standard iodine solution (1 litre corresponding to 50.0 gms. of anhydrous sodium sulphite), corresponding to 0.179 gm. or 14.7 per cent. sodium sulphite.

Alkali Metals: 0.2135 gm. gave 0.0512 gm. mixed sodium and potassium sulphates. This corresponds to 5.4 per cent. potassium iodide, plus 14.7 per cent. sodium sulphite, plus 3.7 per cent. sodium carbonate.

Nitrogen Estimation (Kjeldahl): 0.6030 gm. required 11.5 ccs. of N/10 acid, corresponding to 0.198 gm. or 32.8 per cent. of p-methylaminophenol sulphate.

Composition:

Hydroquinone	52.0 per cent.
p-Methylaminophenol sulphate	32.8 ,, ,,
Sodium sulphite	14.7 ,, ,,
Potassium iodide	5.4 ,, ,,
Sodium carbonate	3.7 ,, ,,
	108.6 ,, ,,

Metol Substitute (*June*, 1918).—The material was extracted with ether, which, on evaporation, left no residue. Methyl alcohol dissolved a considerable proportion. The filtrate, on evaporation, left a residue consisting of pure ammonium p-toluenesulphonate, which was identified by the preparation of the corresponding sulphuric chloride and sulphonamide, both of which had the correct melting points. Further examination showed the presence of a salt of p-methylaminophenol and a small amount of some sodium salt. Sulphate was found to be present.

As ammonium p-toluenesulphonate has no developing action, the principal interest lay in the proportion of p-methylaminophenol present. A weighed quantity was accordingly dissolved in water and heated to boiling. To the boiling solution an excess of sodium carbonate solution containing a small amount of sodium sulphite was added, and the mixture boiled until every trace of ammonia was expelled. The residue was then immediately acidified with dilute sulphuric acid, and the nitrogen determined by the Kjeldahl method: 0.1200 gm. required 8.5 ccs. of N/10 acid, corresponding to 0.146 gm. or 12.0 per cent. of methylaminophenol sulphate. The material thus contained 12.0 per cent. p-methylaminophenol sulphate, the remainder consisting of ammonium p-toluenesulphonate together with a small proportion of sodium salts.

Adulterants

These are of such diverse nature that it is impossible to suggest any general lines of examination. Among the adulterants and useless substitutes the following have been encountered:—Starch, cane sugar, citric acid, sodium formate, potassium oxalate, Rochelle salt, potassium ferrocyanide, boracic acid, borax, potassium bromide, potassium iodide, potassium nitrate, sodium chloride, sodium sulphate, sodium sulphite, sodium bisulphite, sodium sulphide, sodium hydroxide, sodium carbonate, ammonium chloride, ammonium sulphate, calcium sulphate, magnesium sulphate, lead chloride, and lead sulphate.

H. T. Clarke.

PHOTOGRAPHING OLD PEOPLE

(A Note in the *Photographic Journal of America*.)

Of course it is axiomatic that the first office of a picture (a portrait) is to be a likeness, and however much this self-evident truth has been lost sight of in these later years, since the desolation of retouching has darkened the land, and photographers have lent their efforts to catering to the vanity of females of both sexes, the cardinal reason for making portraits at all remains as in the beginning.

All persons, of whatever age or condition, are interesting (if they are drawn) to one who has a talent for likeness making, but to me old people have a peculiar interest as subjects. Babies and very young children afford a kind of whimsical grotesqueness in their efforts to get the hang of life; the young man and woman in their gathering strength and charm furnish fine studies; the middle-aged, who have developed all their powers, and are in the midst of the battle of life, call for serious and thoughtful work, but the old, who are emerging from the thick of the fray, bearing upon their faces and in their air a record of the experiences that have come to them, set against a background of racial lineaments, form a class at once distinctive and unique, and are perhaps the most difficult to manage. In the first place, the old person often feels that the fact that he is old demands an apology, or at least an explanation, to account for the folly he commits in having a picture made. He seems to feel that there is no beauty but the beauty of youth, and that the furrows of his cheek and the wrinkles of his brow are something for his younger family friends to be ashamed of. Hence it is very difficult, if you would please your sitter, to exercise that temperance in retouching that a successful portrait calls for. I remember an old lady who came to me and placed quite an order. She impressed me as a most beautiful old lady; her hair was still abundant and evenly turned to white, her face was a perfect network of soft lines (you could hardly call them wrinkles), and her expression was one of great refinement and sweetness. I secured one negative that I thought was ideal, and her pictures were made from it. It was retouched little, if any; it was so soft and delicate that a retoucher's work would seem like a bull in a china shop. Some time after I saw her and found that the photographs were but indifferently satisfactory. She told me that she had a sister whose face bore more of the marks of age than her own, and that her pictures (by another photographer) did not show a trace of them. There you are with the average old person, especially if it is a woman; but there is a compensation in the fact that a good, faithful likeness is sure to please the friends of the sitter, and, moreover, a sense of duty performed in sending down to their posterity a true portrait of their relative in his or her old age. Such pictures are very interesting to the family in later years. But there are some things to be observed if you are to secure a good portrait. In the first place, they should never be disposed of hurriedly. They come a little sensitive about their old faces, and somewhat geared up at the thought of sitting. Take time to have some conversation with them, and establish, if possible, a feeling of familiarity and sympathy; make them feel that you are interested to get something that is really good, and that it is not wholly a matter of business with you. Characteristic attitudes count for much more in the way of likeness than with younger people, and for that reason it seems to me that a half-length or full figure is better than a bust in many cases. Then comes the question of accessories, which should be something not out of line with the apparent condition in life of the sitter. Sumptuous furniture and stately interiors are a mockery and an absurdity when your subject is a plainly dressed old person of the humbler class. A chair that suggests the comfort that old age requires often adds much, but, what is better still, is the chair they are accustomed to sit in at home. I have sometimes been asked if their home chair might not be sent in for the purpose, and the idea is a good one. The nearer we get to chimney-corner effects the better. For that reason, sittings made at their homes, where some familiar objects can be included, are of especial value. True, we may not be able to achieve as fine effects in lighting, or find our accessories to give the balance of light and shade we desire or to please us entirely in the matter of composition, but the home sentiment will outweigh them all. In not many cases, perhaps, will these home sittings be had, for various reasons, particularly the increased expense, and we must fall back upon such things as we have under our skylight. When we find that we have nothing that accords with the personality of the sitter, it is better to employ a perfectly plain ground that will give proper relief to the subject, and, at all events, not detract from the likeness by dragging in elements that are foreign.

I am convinced, too, as I have explained before, that in the case of old persons a prolonged exposure is better than a short one, for the reason that the tense muscles with which the sitting commenced will relax, and several expressions, perhaps, will flit over the face before its close, the blending of which will almost always secure a better expression than a short exposure.

A ONE-SOLUTION INTENSIFIER.

(From Rajar "Trade Notes.")

The mercuric iodide one solution intensifier should find a place on every busy photographer's shelf. It will readily give considerably increased contrast to a thin negative, is particularly safe to use, and its advantages are:—

1. A ready-at-hand solution that keeps well, and can be used over and over again.
2. If the negative contains traces of hypo no harm will be done.
3. Can be used locally to intensify parts of a negative.
4. Intensification can be removed if desired by simply placing the negative in the fixing bath.
5. Local reduction is easy. Parts of the intensified image can be painted over with a brush charged with hypo solution.
6. It is reasonably permanent, and cannot give stains.
7. Can be used to give "sparkle" to lantern slides.

To make up the solution, take say 100 grains of mercuric chloride, crush and place in a small linen bag. Suspend this in a 20 ounce wide-mouth bottle near the neck, and fill the bottle with hot water. When dissolved (it will take some time), take out the bag and burn it. Now add a few crystals of potassium iodide gradually, shaking the bottle all the time. The solution assumes an opaque salmon colour, and the iodide must continue to be added cautiously until the solution becomes fairly clear and transparent, but with still a trace of red colour left. Add no more iodide, but drop in a small crystal of hypo about the size of a pea and the intensifier is ready for use.

The negative, after the usual fixing and washing, is immersed in this bath for a few minutes, washed and dried. To ensure permanence the negative can, after being intensified and washed, be placed in any developer for a few minutes, washed and dried, but for ordinary work this is not absolutely necessary. The negative may become yellow in time, but this does not affect its printing quality, and it is possible to almost discharge this colour without altering the contrast by placing the plate in a very weak solution of hypo.

Our dealer friends who develop and print amateurs' films will find the solution useful for the thin under-exposed negatives. Commercial photographers will find it useful for strengthening parts of interior negatives, whilst a negative of a group or a full length portrait taken by electric or flash light can have the weak foreground improved by using the intensifier in a tilted dish.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

A Cheap Fixing-Bath for P.O.P. Proofs.

Many photographers are in the habit of handing their customers a rough proof in the form of an untoned and unfixed P.O.P. print. Whatever may be said in favour of this as saving in time and materials, or that it is sufficient for the needs of the photographer himself, it is not wise to hand those whose understanding of the principles of photography is perhaps nil such a transitory thing as a P.O.P. print direct from the frame, with the instructions, verbal or written, as the case may be, to examine in weak light only. Experience has shown that these instructions are as a general rule disregarded, and by the time one or two interested people have inspected the print the technique that it may have possessed will have undergone a decided change for the worse. It is certain that many operators do not wish to go to the trouble and expense of toning and fixing the print in the proper way, since this must represent so much waste, and the writer, when requiring a rough proof, is in the habit of fixing his prints in the following simple and economical solution:—

Hypo	4 ozs.
Alum	¼ oz.
Water	20 ozs.

Printing should be carried much further than for ordinary toning and fixing, as this bath will be found to have a reducing effect. Prints should be placed in the solution without previous washing, and since permanence is not required, five minutes is long enough. A wash of about fifteen minutes in running water will get rid of most of the hypo and leave the proofs permanent enough for their purpose. The writer has never had any occasion to complain of the colour upon any standard brand of P.O.P., though the tone varies with different makers' paper. It has been most successful with Wellington and Imperial P.O.P. It was not expected that any print treated in the above manner would last more than a few months, by which time the purpose which it was intended to serve would have been accomplished; but the writer, going over some old prints made in the way described over four years ago, recently found that they had not altered in the least, and were equal in every respect to those gold-toned, fixed, and washed with the most elaborate care.—Expert.

Developer Stain.—With reference to C. M. C.'s inquiry regarding removal of stains from fingernails, the following simple hint, proved by experience to be thoroughly effective, might be considered:—Before leaving dark-room, rub some salt briskly over nails, which have first been rinsed and kept wet. The stains will quickly disappear.—R. Mason.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, November 9.

Manchester Amateur Photographic Society. "The Austrian Tyrol in Peace Time." J. Shaw.

Sunday, November 10.

United Stereoscopic Society. "A Dive into Belgium." W. L. F. Wastell, F.R.P.S.

Monday, November 11.

Bradford Photographic Society. "Scenes from the Raiders' Country." E. S. Maples.
Dewsbury Photographic Society. "Photography" Prize Slides.
Manchester Amateur Photographic Society. "The Romance of an Old Canal." J. J. Phelps.

Tuesday, November 12.

Manchester Amateur Photographic Society. "Through Syria and Palestine with a Camera." W. H. Gleave.

Wednesday, November 13.

Croydon Camera Club. "Control in Bromoil." G. B. Clifton, F.R.P.S.
Ilford Photographic Society. "Improving the Enlargement." R. H. Lawton, F.R.P.S.
Halifax Scientific Society (Photographic Section). Evening at Harrison Road.
Leith Amateur Photographic Association. "Art in the Home." J. N. McLaurin.
Manchester Amateur Photographic Society. "Nature all the Year Round." F. Taylor.

Thursday, November 14.

Brighouse Photographic Society. "Highways and Byeways around Scarborough." E. S. Maples.
Hammersmith Hampshire House Photographic Society. "Portraiture." N. E. Luboshez.
Manchester Amateur Photographic Society. "A War Time Holiday." J. Waterall.
Rodley and District Photographic Society. "Bromide Enlarging."
The Camera Club. "The Charm and Variety of London."

Friday, November 15.

Manchester Amateur Photographic Society. "Pictures of Italian Life in Town and Country." T. H. Greenall.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, November 5. Mr. Dudley Johnstone in the chair.

Mr. A. J. Bull was announced to deliver a lecture on the use of colour-sensitive plates, but, as he explained, he had yielded to the persuasiveness of the secretary without due consideration of the fact that little or nothing required to be said on the subject matter proper of his discourse. However, he brought together a number of interesting notes which may be best described as a technical appreciation of relatively recent progress in the manufacture of panchromatic plates. He emphasized that the panchromatic plate such as existed before about the year 1906 was a very different thing from the modern production. Its sensitiveness was of so low an order that the making of a set of three-colour negatives in a case within his recollection, where the work was done in good light in the National Gallery, occupied two days. The ratio of exposures of these old plates to blue, green, and red might be stated as approximately 1 : 5 : 50, or the figure for the red might be as high as 200. In the case, however, of a modern plate the ratio might be the very different one of 3 : 3 : 1, the lesser degree of exposure to the red being explained by the use of half watt lamps with their deficiency in blue rays. The very great sensitiveness to red of the modern panchromatic plate had proved of immense value in three-colour work by superseding the employment of collodion emulsion for the making of half-tone colour negatives by the indirect process. Another notable application of it had been the production, by its aid, of realistic photographs of furniture showing the grain of the wood and utilisable as traveller's samples

Mr. Bull proceeded to show on the lantern screen a number of comparative examples demonstrating the immense superiority of the results obtained with panchromatic plates as compared with ordinary in the case of such subjects as vases, woodwork, and in particular of objects requiring to be photographed by transmitted light.

He concluded his lecture by some practical hints on the making of light-filters, quoting some recent experiments he had made on the use of a new British filter dye, Filter Yellow A. With panchromatic plates and for a degree of colour correction such as gave a full rendering of the reds in the subject the quantity of this dye required for use with daylight was 1.0 mgm. per sq. cm. For use with half-watt lamps, 0.2 mgm. per sq. cm. sufficed; with enclosed arcs the quantity required to be 2.0 mgm. per sq. cm. Filters were very readily made by preparing a solution of soft gelatine containing a quantity of the dye sufficient for the area of the piece of glass to be coated. On drying and cutting through all round the gelatine film, the latter could be stripped off, cut into pieces and mounted between a pair of glasses by cementing with Canada balsam thinned with chloroform. Mr. Bull referred to the necessity of the highest optical perfection of the glasses for the most critical work, but pointed out that for filters to be used with comparatively short focus lenses ordinary patent plate answered well if selected by a simple test which consisted in viewing the two reflections of an object such as a bar and noticing whether, when the glass was tilted, the two images moved steadily parallel with each other.

A brief discussion of the paper followed, and the hearty thanks of the meeting were accorded to the lecturer.

CROYDON CAMERA CLUB

Mr. A. H. Blake, M.A., last week gave a lantern-lecture on "The Humour and Pathos of London Streets," a title which may arouse curiosity as to the possibility of the camera depicting these attributes of Metropolitan outdoor life. Photographic art is rarely humorous and seldom pathetic, except in a sense not sought for by its exponents, so Mr. Blake set himself a problem by illustrating his main theme photographically, yet both pathos and humour were well introduced, from the beheadal of Charles I. to the hat and paper manipulators playing to theatre queues, and sundry ardent social reformers on the ramp. Although it was understood that the lecturer was not present at the time, a most vivid sketch of the execution was given, the accompanying slide mingling the tragic and comic in excellent style. When it comes to the Kaiser's turn the exclusive rights of the "movies" depicting the ceremony should be worth having. Here is a chance for some enterprising American firm.

The lecture throughout was really first class, and of much literary charm. It brought home to one how little many Londoners know of the history of London, though Mr. Blake's invariable assumption to the contrary instilled a feeling which may be described as irrationally grateful and comforting. All kinds of interesting people, he said, are to be seen in the streets, but most are too shy to intercept them and cultivate their acquaintance. Obviously he does not share this shyness, though, apparently, he draws the line at pretty femininity, ever interesting, albeit, on occasion, dangerous. No possible scandal could attach to the one slide shown of a young lady, aged about 90, with an amiable face like a piece of broken pitch. In this case a pinch of snuff constituted the introduction.

Not a few of the slides were very beautifully hand-coloured, from an artistic point of view far finer than many a screen plate production. These included night scenes, some of impressionistic order with figures boldly drawn in, and so happily done as to present no feeling of incongruity owing to the admixture of the cunning of the hand with the art of the camera. Mr. Blake said the colouring was the work of a skilled artist, who, when possible, visited the original scene to ensure fidelity of rendering. That artist could give a most interesting evening to any photographic society if he or she could be prevailed upon to do so.

A most hearty vote of thanks was accorded Mr. Blake by an audience which, if somewhat small in number, was large in appreciation. Doubtless the "flu" operated to limit the attendance. The best safeguard, according to the papers, is to keep cheerful, and the paragraphs and startling headlines they devote to the subject possibly represent the journalists' best efforts to assist in this direction. Nevertheless, they appear to be open to improvement.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

Oil Printing and Transfer, by Mr. Coupland, drew quite a crowd on Monday last and those present had the pleasure of seeing a demonstration which is one of the most interesting ever given at the Society. Mr. Coupland began by saying there is no difficulty in transferring, and went on to explain the process in detail. Double transfer paper, as supplied by the Autotype Company, is obtainable in a variety of surfaces, and should be sensitized in a 3 per cent. solution of bichromate of potash. Ammonium bichromate might be used to advantage, but the solution he recommended gave perfect results in his hands. The tissue should, of course, be dried in the dark, and printed in contact to a depth equal to that in platinum printing.

Light has an etching effect upon the gelatine surface, and when printed there is a grey image, which can be brought up to the stage for inking up by washing. Washing consists of a few changes of water, sufficient to remove all trace of the bichromate, after which the print can be left to soak all day, or for two days, to advantage.

If the image is over-printed the ink will not transfer in a satisfactory manner, but seems to stick to the gelatine.

The final support, or paper to which the print has to be transferred, could be any grade of smooth paper, such as cartridge paper, Whatman drawing paper, or a good writing paper. Art papers, re-surfaced papers, as used for the production of tri-colour prints, is not suitable; the ink pulls away the special coating, and these papers cannot be used for oil transfer.

The ink should be kept on the stiff side, only a very small quantity being required to ink up a dozen or so half-plate prints. The ink should be spread on a waste negative and the brush lightly applied, so that only the tips of the hairs pick up the ink.

Try the brush on a plain piece of glass, and as soon as it leaves an even tint it is ready for use. Work over the print quickly. Rapid dabbing will remove the ink from the high-lights.

Oil transfers can be made from bromide prints by the Bromoil process, but the oil printing process is more certain and easier to work. A bromide will sometimes refuse to ink up, but never an oil print.

When the oil tissue to be inked up is removed from the soaking water it should be placed face upwards on several sheets of damp blotting paper supported on a sheet of glass. Four strips of type-writing paper are cut about 1 in. in width for use as safe edges. These are soaked and placed round the tissue, so as to provide a ¼ in. white margin, as a perfectly clean edge is necessary if a really good transfer is required.

The surface moisture can be removed by applying a clean sheet of blotting paper. This did not have any injurious effect, and was much easier than the usual method of using a piece of cambric. Mr. Coupland mentioned that the best ink he had ever used is a litho ink, known as "special black," and manufactured by Messrs. Winstone, of 100 and 101, Fetter Lane, E.C.

To prepare the paper for the transfer it should be placed in water for two to three minutes to allow it to expand, taken out and placed between clean blotting boards and passed through an office press or through the wringer.

The safe edge strips could now be removed and kept for future use, the oil print carefully lifted up and placed face downwards on the damp paper, the moisture blotted off the back of the print.

The oil print and the final support should now be placed upon a clean sheet of blotting paper supported by two or three thicknesses of strawboard, covered with a few sheets of blotting paper and more strawboard, and passed through the press or wringer. Before the oil print is lifted off all four edges should be marked on the final support, so as to facilitate register should a second or third transfer be necessary. The corner of the oil print should be lifted up and stripped off. If the shadows required more depth, those parts should be inked up again. Before inking up a second time the oil print should be dipped into the bath and blotted off, as when first started, and the oil transfer print should be placed between damp blotting boards to keep the paper in fit condition; otherwise it would dry and shrink, making register a very difficult matter. The pencil marks on the oil transfer print were a guide to work to when transferring a second or third time.

Fifty to sixty impressions could be taken from one print before the gelatine gave out, and some very beautiful effects can be obtained by the application of various colours, laying one over the other, or only making up portions in colour. This requires some skill and a knowledge of what colours to use. High-lights could be strengthened by removing the colour by the aid of a small water-colour brush, which should, of course, only be applied lightly

Commercial & Legal Intelligence.

NEW COMPANIES.

A. Brezet and Co., Ltd.—This private company was registered on October 20, with a capital of £10,000 in 9,500 6½ per cent. cumulative preference shares of £1 each and 10,000 deferred shares of 1s. each. Objects: To acquire all or part of the business of A. Brezet and Co., of 145, Wool Exchange, E.C., and to carry on the business of manufacturers of and dealers in colours, oils, varnishes, electrical, chemical, photographic and scientific requisities, etc. The subscribers (each with one preference share) are: F. W. Cowham, 118, Minard Road, S.E.6, clerk, and C. J. Brooks, 108, Wightman Road, N.4, clerk. The directors are to be appointed by the subscribers. Solicitors:—Ashurst, Morris, Crisp and Co., 17, Throgmorton Avenue, E.C.

News and Notes.

Death of Mr. Tom Whiles.—We are sorry to announce the death, suddenly, last week, of Mr. Tom Whiles, Northern representative of Messrs. Criterion, Ltd. Customers of the firm with whom he was in touch are asked to address any enquiries direct to the Criterion Co., Stechford, Birmingham.

Royal Institution.—A general meeting of the members of the Royal Institution was held on Monday afternoon last, the 4th inst., His Grace the Duke of Northumberland in the chair. Special thanks were returned to Mr R. Pearce for his donation of £100 to the Research Fund. It was announced by the secretary that the Christmas Course of Juvenile Lectures would be delivered by Professor D'Arcy Thompson, the subject being "The Fish of the Sea."

The Lighting Order.—Edith Weightman, manageress, was fined 5s. at Newcastle last week for having contravened Part IV. of the Lighting and Heating Order by having the shop-windows of a general photographic shop in Collingwood Street illuminated by electricity at 7 p.m. on October 12. Supt. Tedlie said this was the first prosecution of the kind, and the desire was to let the public know that the Order must not be contravened. The Order prohibited window lights.

Messrs. Raines and Co., of Ealing, have had the misfortune to have their engine room destroyed by fire on Friday night last, and but for the fact that a number of the staff were still at work and acted with great promptitude, no doubt the whole of the works would have been practically destroyed. The staff kept the fire from spreading beyond the engine room, until the arrival of the fire brigade, with fire extinguishers. Messrs. Raines hope to have everything running again by the time this announcement appears.

Tribunal Appeals.—At Burgess Hill a photographer, 38, Grade 2, put in a medical certificate as to his unfitness for military service. He knew the requirements for photographers with the Air Force.—The National Service Representative said there was now an urgent demand for photographers in the Air Force. In the case of applicant, it would be indoor work, developing photographs.—Mr. A. J. Bridge strongly opposed taking unfit men, to become a burden on the country in hospital.—Six months' exemption granted.

Death of Mr. R. C. Murray.—We very much regret to record the death last week of Mr. R. C. Murray, for many years connected with the photographic trade, and through his father of the firm of Murray and Heath, supplying a link with the earliest days of photography. His father's firm as scientific instrument makers supplied the early cameras to the studios of Fox Talbot, Claudet and others, and Mr. Murray's recollection extended to his visiting as a boy these first scenes of portrait photography. Throughout his life Mr. Murray continued to take a lively interest in the development of photography, and, as the possessor of a most kindly and courteous disposition, was invariably ready to draw upon his recollections for the benefit of any interested enquirer. His death will be sincerely regretted by all who had any occasion to know him.

P.P.A. and Society of Master Photographers (Lancashire and District).—A pleasant time was spent after the Council meeting (October 17) in friendly business talk with members of the newly-formed Society of Master Photographers (Lancashire and District). The representatives of that association were Messrs. N. S. Kay (President), F. Kenworthy (Treasurer), Saronie, Smith, Howell, Huish, Ash-Martin, and F. Read (Hon. Secretary); unfortunately, not all of whom were able to be present. Mr. Read, telling of the doings and aspirations of his Society, mentioned that they had already obtained 108 members, and intended to get 70 per cent. of the total numbers of professional photographers doing business in the district covered by the Association, within twelve months. Apologising for the absence of their president, he said travelling was difficult and not pleasant. He himself was drawn into photography from the business side, and was now running nine concerns either alone or in partnership, and his great object in running the new Society was to overcome the aloofness of professional photographers. His Society wanted to get them to act together in matters of common business interests in a friendly spirit. They were trying to get their members to fix a maximum closing time, photographers in each town to agree amongst themselves as to what that time should be. They hoped to be able to fix a minimum price for postcards and cabinets, and in this connection he asserted that photographers often failed to realise what the costs of production really amounted to. He was working to get a combination of the masters in regard to the giving of references and particulars as to previous salaries of employees. In fact, his Society aimed to serve a really useful purpose between local photographers. He congratulated the Council of the P.P.A. on their work, especially in connection with the Luxury Tax, and added that they were recommending their members, if not already subscribers to the P.P.A., to become so. With regard to the price of plates, he feared photographers had no option but to acquiesce, but he protested against the un-English, cold-blooded, and arbitrary way in which the manufacturers had acted. Mr. Read finished an interesting and virile talk by expressing the hope that the P.P.A. would be able to see their way to hold some function (? a congress) in the North or Midlands at some future time.

Correspondence.

** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

** *We do not undertake responsibility for the opinions expressed by our correspondents.*

MATTERS OF PROFESSIONAL MOMENT AND THE P.P.A.

To the Editors.

Gentlemen,—It is said that the leopard cannot change his spots, and it is certainly true that "Small Pro." and other pros. of the same nature will not and do not intend to change theirs. By their extreme generosity in giving advice which costs them nothing in the hope that they may gain without cost to themselves, you may know them. The leopard is of the cat tribe, and of equal cunning is the "Small Pro." tribe. With humility, artfully assumed to camouflage the part that, to save his pocket 5s. a year, he is not in a position to entitle him to a voice in the policy of the P.P.A., your correspondent makes the suggestion that those who are paying and working for him and the rest of the professional community should pay more and work more, to the end that he may benefit by the victory without sharing in the heat and turmoil of the fray. He truly says "we are not all angels," and I may add we are not all fools. Some of us have enough experience of the nature of the "Small Pro." tribe to know that those who are so mean as to grudge the penny a week or so it would cost them to help to make the P.P.A. a power will not be wanting in excuses for not subscribing a larger sum under any circumstances whatever. Your correspondent would more appropriately have signed himself "Small-minded Pro."

Diogenes.

FINDING OUTDOOR LIGHTING

To the Editors.

Gentlemen,—The somewhat belated addition Mr. Charles makes to his instructions for use of the dial certainly put the figures right but somewhat violates the ideas one has of the subject being stationary, and the sun moving around it. If I use the dial myself I shall invert it, *making 12 o'clock north.* I will consider the subject to occupy the centre of the dial and the sun to travel round. It will then give exactly the same reading of light direction as when read as Mr. Charles directs, and will have the merit of being "based on actual facts that exist." OLIVER HORTON.

Glasgow.
November 2, 1918.

CHEMICAL POISONING

To the Editors.

Gentlemen,—Having read from time to time letters in your esteemed journal referring to chemical poisoning, I wonder if this would interest your correspondents. For a considerable time I suffered with weeping Eczema, caused by using chemicals. My hands and arms, neck and face, were covered with it, and I was in agony. I tried almost everything to cure it, but nothing touched it, until I tried "Ujah," which is advertised in the "Journal." One jar of this absolutely cured me, and although I work regularly with chemical solution, there isn't a sign of Eczema returning. Having been cured myself, I should like other people to have the same chance.—Yours faithfully, A. HOSSACK.

[illegible] Lower Addiscombe Road,
Croydon, Surrey.
October 31, 1918.

ART CLASSES FOR RETOUCHERS

To the Editors.

Gentlemen,—I was very interested to read in your issue of October [illegible] the Presidential address by Mr. E. Drummond Young before the Edinburgh Society of Professional Photographers. Speaking as an artist I agree entirely with Mr. Young's argument and feel sure that a course of study at a School of Art, consisting of drawing heads from the bust and from life together with modelling and composition would be an invaluable part of the training of retouchers and photographers. In this school we have several photographers working in the evening classes who have felt the need for it themselves.

If it would be of any general assistance I would be glad to furnish further particulars to show how an art school might assist and would be glad to [illegible] such a course here.—Yours truly,

ARTHUR STEWART
(Head Master).

South-Western Polytechnic Institute,
Manresa Road, Chelsea,
London, S.W.3, Art Department.
November 5.

LATENT IMAGES IN GLASS

To the Editors.

Gentlemen,—The experiments put forward by Mr. J. H. M. [illegible] in your issue of November 1 are very interesting, and it is to be hoped that experiments will be made to test them.

The whole question of latent images in glass is one well worth threshing out, as it is one of those problems likely to throw useful side-lights on the nature and constitution of glass, and assist in solving other seemingly quite disconnected problems of considerable practical importance.

Experiments which I have made during the last years on the [illegible] of metals into the surface layer of glass have convinced me more and more that we should regard glass as a substance full of ultra-microscopic pores. The size, number and shape of these pores near the surface depend on many factors, such as the chemical composition of the glass, the method of manufacture, the polishing of the surface, the [illegible], etc. When glass is cleaned, rubbed, [illegible] or treated in any way whatsoever, material is liable to be introduced into the ultra-microscopic pores which it may be difficult subsequently to remove by the usual cleaning processes, even when every endeavour is made to do so.

I suggest that the material thus left in the pores, forms the basis of the latent image, each filled up surface pore becoming a nucleus or condensation centre for the deposition of moisture or other substance by which the image subsequently becomes visible.—Yours faithfully, JULIUS RHEINBERG.

23, The Avenue,
Brondesbury Park, N.W.6.
November 4, 1918.

ASSISTANTS IN THE P.P.A.

To the Editors.

Gentlemen,—"Small Pro." draws attention to the desirability of fraternity among photographers. There was a suggestion made by Mr. E. J. Sanders, during the business meeting of the last Congress, that assistants should be admitted to the P.P.A. as "Associates." This was promptly squashed by Mr. S. H. Fry (hon. treas.), by an emphatic assertion that the P.P.A. is out and out a Masters' Association. If we accept this as an "official statement," then the P.P.A. is indeed a trades union in the undesirable sense.

In the constitution of the Association membership is restricted to "those in business on their own account, partners and responsible managers," yet the very first object stated is "to improve the status of those practising photography as a profession." Now surely the assistant practises photography as a profession, but what is his status?

Let us open the P.P.A. to "associates" and we shall get the assistants who mean to grow to full membership. Foster his interest in the Association. He must have his benefits of course. Here is an opportunity for—shall we say—an Assistants' Employment Bureau.

The assistant of to-day is the employer of to-morrow. Acknowledge him now, show him what fraternity in his profession means, and we shall avoid the constant pleading for new members when he qualifies for full membership.

Such association should not produce labour trouble; it should not be on the lines of labour unions. Of course, if one is a master whose assistants will not go within a mile of him outside business hours then one is making trouble for oneself. There is another kind of trouble maker to whom a little self-examination would be a revelation: The man who neglects his obligations to the indentured apprentice. He turns out the 25s. a week man and then says "assistants are a rotten lot." Their status is his creation. What an achievement! I have also met employers (happily there are two kinds), whose apprentices and assistants have respect, yes, even affection for them. No labour union could induce them to do anything contrary to his interests.

We all, I feel sure, appreciate the activities of the P.P.A. on our behalf, but we cannot expect to witness the animation of "Live Edinburgh" there. In the one case we have an able body of men working for the whole association and for the individual member as required. In the other there are local conditions affecting personal interests. True, they also have a wider interest and discuss it to the common good, but their immediate interests and attractions are local news, local conditions and their influence on local business.

Let each county have its branch of the P.P.A., with its own organisation and syllabus. Let each county elect its representative on the P.P.A. Council.

Admit assistants as "Associates." (A county scheme if you will.) Have an Assistants' Employment Bureau. For a start in education may I suggest a circulating library of technical books, not forgetting the business side with its book-keeping, advertising salesmanship, correspondence, etc., etc., run on the lines of a postal club. Lastly, a standard of apprenticeship backed by the Association.

These are just a few suggestions, and, if we are to move with the times, not impossibilities. Can the P.P.A. help in this direction?—Yours faithfully, T. HORACE CHAPMAN.

15, Cleveland Street, Stourbridge.
November 2, 1918.

FORTHCOMING EXHIBITIONS.

October 14 to November 30.—Royal Photographic Society. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

November 9 to 16.—Manchester Amateur Photographic Society. Hon. Secretary, Walter Johnson, 30, Hartington Road, Chorlton-cum-Hardy, Manchester.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesdoy (posted Monday), and should be addressed to the Editors.

T. M. MAINTY.—If we were you we should not change. Your present lens is the better for your present requirements, and just as saleable at a good price as the other.

L. W.—Amidol poisoning is comparatively rare, and we have had no correspondence on the matter. We should think that the remedies usually employed for metol poisoning would be equally effective with amidol.

F. F.—If the paper is all like the sample, it is only worth waste-paper price. We assume that it is baryta-coated, but not sensitised. The sample you send does not enable us to form any idea of the value of the bulk.

H. F. T.—We cannot say that we ever heard of the process, and from the outline of it which you give we should very much doubt if it is workable. There appears to be some misconception of the insolubilising action of bichromate salts.

A. H.—We do not find this lens in any list, but it appears to be a Petzval form of portrait lens which we know this maker issued. One we have seen had an aperture of about f/4. The value of one of 5½-in. focus would be 20s. to 30s.

G. G.—Your card shows every evidence of great under-exposure. Try giving three times as much as the sample had and develop fully. The lighting is not at all bad for outdoor work. We should prefer a good ordinary plate, as these will stand a fair exposure without giving flatness.

R. M. F.—The ¼-plate series I. Velostigmat is listed at 23 dollars in Regno shutter, 26 dollars in Auto shutter, and 33 dollars in Optimo shutter. None of these shutters corresponds in appearance with the Ensign Sector, but as the latter is only priced at 25s., we should consider it as equal to the Regno, listed at 6 dollars.

W. H. THOMAS.—There is plenty of this kind of apparatus to be bought from the dealers in secondhand goods, but we would caution you about being over-confident as to the popularity of the specialty. In other words, if you can see reasonable profits on your outlay in the course of a few months, we think that is about as far as you ought to go in price.

C. S. HIMLEY.—Your friend is quite right. Dry plates ready for use were on the market about the year 1860, but they were not gelatine emulsion plates, or indeed emulsion plates at all, but were prepared according to the processes worked out by Dr. Hill Norris, according to which an iodised collodion film was sensitised in a silver bath, and then given a preservative coating.

N. K. BATEMAN.—It is not absolutely necessary to boil the mixture of sulphite and metabisulphite, but to do so improves the keeping quality of the developer. Certainly you can boil the two salts dissolved in a smaller quantity of water and make up to the full bulk with hot water, or, rather, with water which has been freshly boiled.

T. C. S.—Mercuric chloride can be made to dissolve very quickly in cold water by mixing it with about its own weight of ammonium chloride. There is nothing to prevent the solution so made being used as the bleaching bath in mercurial intensification, although our own preference is for the customary solution of the bi-chloride or one prepared, according to a very usual formula, by addition of bromide.

H. D. S.—1. Ordinary white distemper applied very thinly and stippled until even. 2. The white blinds are very desirable; they can be used to cover all the glass when the sun is on, then the glass need not be stippled. 3. Grey, greenish-grey, or pale brown. If inside is painted white it may give flat pictures. 4. Any decent lens of about 8-in. focal length. If you can get a Dallmeyer 2B for £5 or £6 it would be a good investment for you.

BUSINESS NAME.—Having purchased a business, and not wishing to change the name just at present, I should be extremely obliged if you would let me know where I register. Have inquired at three Post Offices, but they are ignorant on the matter.—A. R.

If your local Post Offices are unable to supply the form for the registration of business names, you had better apply to the Chief Registrar, 59, Russell Square, W.C., stating why you do so.

D. N. W.—If the negative is excessively harsh, about the best and simplest method of softening it is simply to bleach it in the ordinary mercury bichloride bleaching solution, washing, and drying. It will then print remarkably soft. If too soft, you can use a more contrasty printing paper. We think in the case of a negative which is as chalky as yours appears to be this would be a more satisfactory method than the permanganate or persulphate reducer.

H. H.—1. Anastigmat lenses are now fetching nearly list prices. The lens you describe is listed at £3 15s. 2. We have not found it practicable to reduce the amount of water, when making up Scalol or other genuine metol substitute, below the quantity given in the formula. 3. Certainly, you may boil the sulphite and metabisulphite together in a smaller quantity of water and dilute as you suggest. An enamelled iron saucepan, if unchipped, would answer as well as anything for a boiling vessel.

X.—If you will look again at our previous reply, we think you will see that we were definite in our suggestion. In your circumstances you are bound to sacrifice something in dealing with bust portraits and full lengths, by limiting yourself to one lens in a studio where the working length is barely more than 20 ft. In order to use for full lengths the long focus lens which would be satisfactory for bust portraits, you would want a studio over 50 ft. in length. Your best plan is to choose the focus of lens we suggested, and to get another when you can for the full lengths.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as the acceptance of "returns" by a publisher is now prohibited by the Government. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or book-stall clerk, or to send a subscription to the publishers.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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SUMMARY

To the many regular readers of the "Almanac" we point out that as the paper shortage still continues, the coming edition has to be strictly limited in its extent. It is therefore necessary that an early order should be placed in order to secure a copy. (P. 509.)

News reaches us as we go to press of the death of Mr. A. L. Adams, the well-known designer and maker of cameras, of Charing Cross Road. (P. 519.)

Bromide prints are particularly amenable to modification after fixing, and many can be saved from the waste box by following the instructions given in an article on page 510.

Most photographers know that a relatively short-focus lens is undesirable for portrait work without quite understanding why. The matter is simply and clearly explained with diagrams on page 511.

The application of dyes to various photographic processes has been lately treated by Dr. A. Seyewetz in the French technical journal, "Chimie et Industrie." A translation of a portion of the paper will be found on page 514.

A recent patent specification describes a type of print-washer in which differently placed jets of water, which successively come into action, keep the prints, so it is claimed, in constant movement. The different series of jets are brought into operation by a four-way tap, the movement of which is actuated by water power. (P. 516.)

There are many causes, quite unconnected with the lens itself, which militate against the obtaining of sharp definition; some of the most obvious of these are dealt with on page 510.

A formula for stripping negatives without hydrofluoric acid is contained in the report of a meeting of the Leicestershire Photographic Society. (P. 519.)

At the South London Photographic Society last week a number of hints on the improvement of prints with the hypo-ferricyanide reducer were given in the course of a lecture demonstration. (P. 518.)

Working details of a method of depositing silver mirror films on glass are given in an abstract of a recent paper in an American technical journal. (P. 519.)

The question of the supply of raw material for photographic requirements promises to be an important and perhaps difficult one in the near future. It is to be hoped that the Ministry of Reconstruction will be able to avert serious inconvenience. (P. 510.)

A link with the early days of photography is severed by the death, at the age of 90, of one of the very early members of the Liverpool Amateur Photographic Association, Mr. O. R. Green. (P. 519.)

EX CATHEDRA.

Peace. If not technically a conclusion of peace, the declaration of the armistice on Monday last definitely brings to an end the tragedy of the past four and a-quarter years. We all share the feelings which found expression throughout the country, feelings not merely of triumph over the enemy, but of rejoicing in the world-wide victory of freedom. While the cessation of hostilities cannot have any immediate effect upon the conditions in this country, photographers can now turn their thoughts to the many problems which demobilisation, when it comes, has for them. Broadly, it can hardly be thought that the Labour question will return to its pre-war state, either as regards wages or the class of labour employed. Photography, as an occupation which is acquired with relatively little training in comparison with other trades, is likely, it would seem, to retain a considerable proportion of the new labour drafted into it by the war conditions, and therefore to involve a correspondingly lower degree of readjustment. Whatever it may be, it will be good policy for any changes to be made with deliberation. The country, as a whole, stands to suffer by sudden transference of labour from war to peace conditions, and any step which minimises such change is a service to the community.

* * *

The "B.J." Almanac. Although the closing of the advertisement pages of the forthcoming "British Journal Almanac" took place on Tuesday last, the exigencies of the present time—and they are not likely to experience any measure of relief from the cessation of hostilities—has made such early date necessary in order to publish the volume at the end of January or the beginning of February. Nevertheless, it is not out of place at the present time to address a reminder to those, either dealers or direct purchasers, who wish to secure the 1919 Almanac to place their orders without delay. The very high price to which paper has risen—indeed the difficulty of securing a sufficient supply of paper—has compelled the publishers to maintain the edition at the low number of last year, when it was impossible to fill all the orders received. Evidently many who were unable to secure a supply of last year's "Almanacs" have determined not to be left without it in the case of the forthcoming edition, for we learn from our publishers that the orders for the 1919 volume are very greatly in excess of those received for last year's at a corresponding period. Therefore we make this early intimation, particularly to those of our friends outside of England, that they should order their "Almanacs" without unnecessary delay if they wish to ensure delivery.

Definition. Many photographers have come to regard good definition as depending entirely on the quality of the lens, but this is only very partially the case. The definition of a first-class lens may easily be spoilt by very simple causes, for example, a layer of dust on the glasses, to cite one of the causes which is often overlooked. Recently faulty definition, for which one of the best R.R. lenses was blamed and almost discarded by an operator who had previously used and had a preference for anastigmats, was traced to the camera front being loosely supported on loosely-screwed struts. Observation showed that when the front was loosely screwed the action of the roller-blind shutter caused a slight vibration. We have seen many operators work with struts, etc., far too loosely screwed, in some cases so much so that the pressure of a finger was sufficient to move the front or swing-back. In copying work, when a long bellows extension is employed, rigidity is essential, as, if this is not the case, there is a tendency for the front to be drawn by the bellows, which produces a loss of rigidity that would not be evident at a shorter bellows extension. Another point that needs attention when work of this kind is being done is vibration from heavy traffic in the vicinity. Having the original and camera on the same solid support is a partial, but by no means complete solution of the problem, which is to be regarded as having everything as firmly screwed as possible. If there is a separate space between the camera and the original any vibration, such as a person walking about the room, if the floor is not particularly firm, has been known to cause poor definition, for which the lens has received the blame. The tripod, again, receives very little attention from many operators. More often than not its rigidity is cut down in order to permit lightness, or a flimsy tripod is employed for a heavy camera—another fruitful cause of poor definition. Often, too, the operator devotes too little attention to setting up the tripod or fixing the legs firmly, and when outdoor work is being done, especially if there is any wind, impaired definition is bound to result.

* * *

Raw Materials. With the promised cessation of hostilities one of the most urgent problems which presents itself before manufacturers of many different descriptions of product is the obtaining of raw material. Whilst firms were engaged, as many of them have been for a long time past, upon Government work the system of priority certificates largely solved these problems, but the moment that Government contracts are suspended it will probably happen in the great majority of cases that all such facilities are promptly cut off, and the poor manufacturer who has to turn his attention to the re-creation of his pre-war business will find himself faced with extraordinary difficulties unless some systematic machinery for the supply of the materials he required is promptly set in motion. It seems likely that in the absence of such regulation the early days of the peace period, in view of the competition there will be for raw material of every description, may witness degrees of profiteering such as may exceed any of those which have marked the period of the war. We believe that the rational distribution of raw material is in the hands of the Ministry of Reconstruction, and it may be hoped that effective measures will be taken without any delay. Photographic manufacturers, both of apparatus and material, are interested in this question, and so equally are the buyers and consumers of photographic goods.

* * *

Town Camouflage. Inasmuch as the fact is the subject of an article in the current issue of "Drawing," reference may be made to the work of Mr. F. C. Tilney in designing the piece of war scenery which transformed Trafalgar Square during the War Bonds week. Mr. Tilney, who has been associated with the War Savings Committee as a lecturer and propagandist since the early days of this body, was evidently entrusted with the design of the Trafalgar Square transformation scene, the entire scheme and model of which were his. Design and realisation in such cases are, however, separated by a breach beyond the healing of the designer. Labour difficulties prevented the miniature plan being reproduced in full in the scale of nature, but this discrepancy will not prevent the many people who have appreciated Mr. Tilney's writings on art in its photographic forms from extending to him their congratulations on his share in a natural demonstration which is notable among the many notable achievements of London in the war.

THE AFTER-TREATMENT OF BROMIDES.

When a bromide print or enlargement is not entirely satisfactory in quality, usually the best course is to make another, but at the present prices of materials this is not always desirable. Moreover, the print in question may be the best which it is possible to obtain from the negative, and it becomes necessary to do what we can in such circumstances to make the best of what we have got.

When a print has a flat, foggy appearance a slight general reduction will often effect a great improvement, and for this purpose nothing is better than a very weak solution of iodine, which is poured over the wet print and allowed to act until the high lights turn to a dark blue with a slight yellowing of the finer details of the image. This indicates the formation of iodide of silver, which is dissolved, after rinsing, in an ordinary fixing bath. As the iodide of silver is less soluble than the bromide, it is very necessary to give sufficient time in the hypo so as to make certain that no further change is likely to take place. The iodine solution is made by putting half an ounce of iodine in a ten-ounce stoppered bottle, covering it with water, and adding crystals of iodide of potassium till solution is complete. This gives a deep brown liquid, of which sufficient is mixed with water to give a rather deep sherry colour. It should be used at once, as the solution becomes inert on standing. After well washing from the hypo the image is capable of intensification by any of the methods described later. A method which is preferred by many workers is to use a mixture of iodine and cyanide of potassium, which effects the reduction in one step instead of two, and has the great advantage of allowing local reduction to be done with great facility. In fact, it is quite possible entirely to remove any unwanted portions of the image, even to the extent of turning a solid print into a vignette, heavy skies may be lightened, lights put in upon buildings or foregrounds, and the solid black edges sometimes seen through neglect of masking the negative may be entirely removed without leaving a trace. A very moderate amount of washing, less than is required after fixing, is sufficient after this treatment. It must always be remembered that the solution is highly poisonous, and due precautions should be taken. Much may be done in the way of cleaning up and local reduction by using the well-known ferricyanide and hypo reducer, but this sometimes leaves a faint yellowish image after the black one has disappeared. It is, however, very useful, and, of course, quite safe in use. When reducing locally it is advisable to support the print on a glass slab or the back of a dish close to a running tap, so that the print can be rinsed frequently to prevent hard edges being caused by the action of the solution. A common defect in bromide prints is the appearance of a rusty-looking black, which is usually due to over-exposure and short development, or sometimes hen there has been correct exposure, to the use of an xhausted developing solution. This may be remedied in wo ways, either by intensification with the chromium rocess or by gold toning. The former is preferable, as ot only is it cheaper but such prints are usually benefited y the increased contrast which results. When little in- lication is needed the following formula should be sed:—Potassium bichromate, 100 grains; pure hydroric acid, 50 minims; water, 10 ounces. The print will pidly bleach in this solution, and will appear much as t would if the ordinary ferricyanide and bromide bleacher ere used, except that the white parts will be stained a right yellow. This will disappear with thorough washng, after which the image is re-developed with amidol, en it will change to a pure black colour with a slight rease of contrast. Prints so treated are quite permant, but are not suitable for sepia toning. Another way curing rusty blacks is to immerse the print in an ordiry gold and sulphocyanide toning bath, as used for O.P. In this the blacks gradually become colder in e, and if left in too long will turn to a slaty blue. he prints should be well washed, but require no fixing. In order to appreciate the change made by either of these thods it is a good plan to cut an old print into halves d to treat one half only; when the two are compared e difference will be clearly seen.

For Press work, where permanency is of no moment, prints may be intensified with the ordinary mercury d ammonia solutions, which give greatly increased depth d a good brownish black. More permanency can be tained by blackening with the ferrous oxalate or amidol velopers, but no reliance can be placed upon any image ntaining mercury.

As we have referred to the gold sulphocyanide toning bath for giving pure blacks on black and white prints, it may be well to point out that its action is very different with those which have been sulphide-toned; with such, a good red chalk colour is easily got by simple immersion for the requisite time, followed by fixation in a plain hypo solution.

It may be required to reduce the strength of an overdeveloped print from a hard negative, and for this the chromium intensifier will be found very useful. The procedure is to bleach and wash as usual, but only to develop to the desired depth, finishing by a second fixing to remove the unreduced silver haloid which had not been required to form the second image. It is, perhaps, hardly necessary to point out that all the operations we have mentioned may be conducted by gas or electric light, or in weak daylight.

Stress or abrasion markings are very common upon some makes of bromide paper, and sometimes are difficult to move by the ordinary method of friction, either with cotton wool while wet or a soft rag and methylated spirit when dry. In such cases they would be found to yield quickly to a very dilute ferricyanide and hypo solution or a very weak iodine-cyanide reducer. Stress markings may be to a great extent avoided by adding 3 or 4 minims of a 10 per cent. solution of iodide of potassium to each ounce of developer. This addition tends to reduce contrast in the prints, and should not be made when thin negatives are being used. The general chemical fog caused by excessively prolonged development is best treated with weak iodine-cyanide solution, taking care to stop the action before the image itself is attacked; with a very weak solution, which will quickly clear off the developer fog, it takes a considerable time to make any appreciable effect upon the image.

THE SHORT-FOCUS LENS IN PORTRAITURE
THE CASE AGAINST IT.

t has been advised, when choosing a lens of suitable focal ngth for a given length of studio, to regard the sitter in he same manner as when making a copy. That is certainly useful also when one is cramped for room and is compelled make accurate calculations as to whether a particular lens ll get a full-length on the plate in the given space or not; ut except for this particular case, a portrait should very rtainly not be considered as being merely copying—i.e., though the subject were all in one plane.

There are several reasons for this. In copying a flat subject makes not an iota of difference as regards the scale in hich various parts of the object are rendered on the plate, hether one uses a long or a short focus lens. That is to say at if one photographs, say, a brick wall "dead on," with ny decent lens, every brick will be the same size in the gative, whether in the centre or at the margins. To take other example, a foot-rule or other scale can be enlarged or duced in the camera with the certainty that it will be rrect all through whatever lens is employed.

Not so a portrait. One knows that it does not do to let the tter sprawl too much towards the camera, or hands and et are apt to look too large. Also that the people in the ont row of a group often are rendered noticeably larger than ose in the back row. This is put down to the so-called distortion" or "wrong perspective" given by a short-focus s. But what I want to show is that because these very vious faults are not seen in a portrait it must not be conded that all is necessarily well. I will try and prove that there is bound to be a little of this "distortion" in every portrait made with a short-focus lens, and that to give as correct a likeness as possible it is essential to use a lens of as long a focus as one reasonably can in every case. It is very likely that many of the instances where a sitter is mysteriously displeased with what the photographer himself considers a fine portrait can be put down to unsuspected distortion of the features.

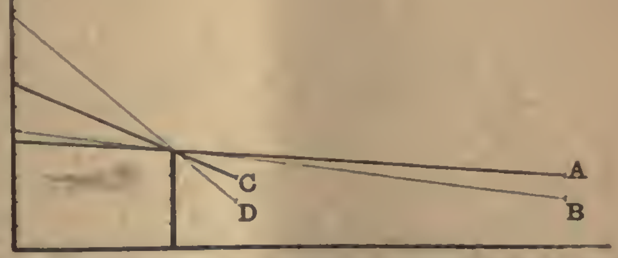

Fig. 1.—A Distant view point shows normal relation in size between two objects. B The eye lowered a foot shows little difference in the perspective or relation in size. C Near view point shows greatly exaggerated relation in size, and D Lowered a foot enormously increases the apparent exaggeration of C.

To commence with, I wish to point out that the perspective given by any lens whatsoever is exactly the same as seen by the human eye from the same view-point. If any question as to this axiom should arise in the reader's mind, I will ask him to examine Fig. 1. Here is an upright wall divided into twelve units, feet, inches, or what you will. A little in advance of this is another wall only four feet, say, high. At the point marked C we place the lens of our camera or of an eye, and in either case we cannot see or photograph anything on the rear wall below where the thick line from C touches it. This is simply because all the light-rays from that wall below that point are cut off by the small wall, and do not reach the lens or eye. If we make a photograph from that particular point, the small wall will appear as high as seven feet in the rear wall.

Lenses of different foci will give very different results from that view-point as regards size of image, of course, and we may please ourselves whether we use a plate that will take in only the central portion of the view or one that will include a very "wide angle." The one factor that affects the perspective, which is the relative size, and so the apparent distance between objects in different planes, is the point from which the subject is observed or photographed. Coming back to the figure, we take the view-point A, which is the same height from the ground as C, the previous one. This more distant point allows us to see nearly everything above the four-foot mark on the back wall, and so the small wall does not appear so exaggerated in size. This proves the most obvious of the points in favour of getting more reasonable perspective by the choice of a distant view-point. Another side of the question is at once seen when we lower the two view-points a foot in each case. The difference in the case of A lowered to B is very slight, but C lowered to D immediately cuts off a very large slice of the back wall.

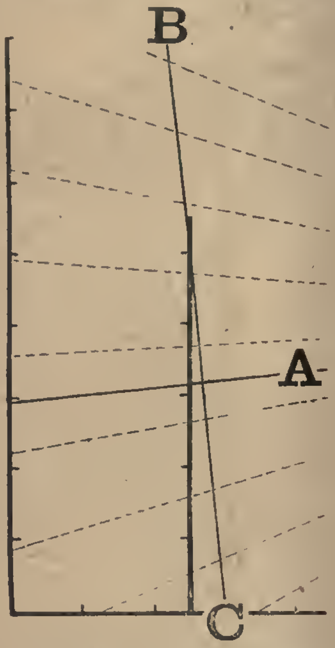

Fig. 2.—Positions (sectional) of 8ft. background and 5ft. 6in. sitter; floor divided into feet. A is axis of 6in. lens at 9ft. distance, 4ft. from ground. B C is principal plane of subject. Dotted lines cut B C into feet. Any part of subject cut by dotted lines will appear to measure a foot in a photograph, whether really greater or smaller.

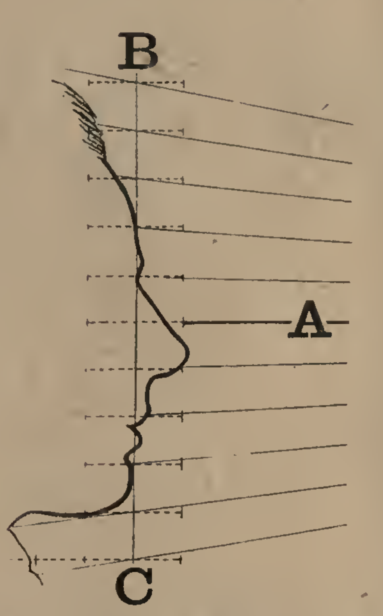

Fig. 3.—Section of head (true to life) divided into inches. A Axis of 6in. lens at 30in. B C principal plane of subject. Thin black lines include 1in. on B C. Parts on other planes touching a pair of these lines will appear as 1in. Note apparent reduction in height of upper part of head.

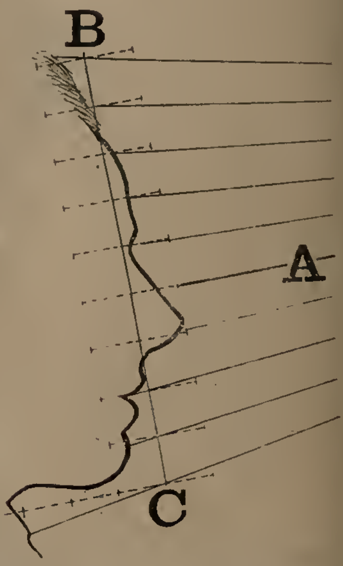

Fig. 4.—As Fig. 3 with lens raised to level of top of head. Note upper part of head rendered almost normal, but lower half considerably foreshortened.

It should not be forgotten that although in the figure only one particular line is taken, that is the one from the eye or lens to the top of the four-foot wall and beyond, the same action applies to every line of light that reaches the lens in every part of the subject. The reader will recognise that in this illustration I have made the conditions more extreme than will occur in portraiture simply so that the principle could be plainly shown, and I will proceed to show that the disproportionate rendering which a near view-point gives in the case of walls is shown also in portraits, probably far more than is suspected. I prefer to say a near view-point rather than blame the short-focus lens, because, as I have shown, it is only the fact that the latter must be used quite near to get a decent-sized image that causes the trouble. The same distortion will show itself with any other lens if we include the same amount of subject.

In Fig. 2 I show in diagrammatic form an eight-foot background, and a sitter 5 ft. 6 in. in height standing full-length at 2 ft. 6 ins. from the background. A is the axis of a six-inch lens at a distance of nine feet from the sitter and four feet from the ground, these being the average conditions in taking a full-length figure to be four inches long on a post card. B C is a line at right angles to the lens axis, which passes through the face of the sitter, and may therefore be regarded as the principal plane of the subject. This is the plane that would be taken when regarding the subject as a copy to be photographed. The dotted lines were made by dividing this principal plane into feet, just as the "background" and "sitter" are, and ruling straight lines from the view-point, where the lens is, through the points.

Having explained the parts of this figure, I will now show the meaning of it. From the lens, at the point mentioned, each division of the line B C between the dotted lines will appear exactly what it is—one foot. Also, as the finished portrait will appear much more as though on the same plane B C than it is in reality, every other part of the subject cut by any pair of dotted lines will appear to be a foot high. If a more distant view-point is chosen (and a longer-focus lens if necessary), the angles of the dotted lines will not spread themselves so violently, as I showed in Fig. 1. I have purposely shown the sitter as a thin, straight line, but I should like each interested reader to sketch in, however roughly, one of his favourite poses, with measurements to scale taken from the actual sitter. Then, noting how the dotted lines cut the figure, he will see to what extent a part towards the lens will fill the space between the lines, and therefore appear to measure a foot, and the more backward portions will appear smaller than reality. For instance, a man standing with the rear hand on a chair-back or holding a cane and the rear hand in his pocket, and turning diagonally towards the lens will measure (along the lens axis A) nearly three feet or eighteen inches on each side of the line B C from the forward hand to the rear elbow. It can be found in this way with very little calculation, or easily proved by practical test, that of two objects of equal size placed in such positions as to represent the points of the sitter mentioned the forward one will be represented as not far short of twice the size of the other.

A six-inch lens is sometimes used for full-length cabinet and postcard work, and it will be seen that the distortion shown by it at 9 ft. from the sitter is considerable. It is seldom used further than this—i.e., to give a shorter image than four inches, and, as I showed in Fig. 1, a still nearer view-point will increase the false perspective, but as then we only use the central part of the image, it is not so apparent.

Fig. 3 shows a profile accurately drawn from life and divided up into inches by parallel dotted lines. If we could view the head from "infinity," the lines from our eyes to these points would be practically parallel too. However, we cannot make portraits from infinity and must put up with at least a little of the distortion of a nearer view-point. Taking B C again as the principal plane and A as the axis of a lens pointed straight at the face (for a full-face portrait), the thin slanting lines show the angles for each inch on B C given by a six-inch lens at thirty inches, giving a reduction of four times—that is, a two-inch image of an eight-inch head. While the centre of the face appears normal, from the eye to the top of the head, actually four inches, is represented to the lens as only four and three-quarters. While this may seem negligible, it must not be forgotten that the same thing happens at the sides of the face, and this slight dwarfing of the outer parts gives an added prominence to the already projecting central portions. It may not be noticed, but it is there, and it can seldom add to the charm of any face. Note that a very flat-faced person will not be exaggerated in this way, but the trouble will show more than ever in those with already prominent features.

Fig. 4 shows the same profile viewed by the same lens at the same distance, but from slightly higher than in the previous case. It is more usual to have the lens about level with the top of a sitter's head and looking down slightly, and in this case the line B C, being the principal plane, will lie as shown. The forehead now will be rendered its full size as compared with the eye and nose, but now the lower half of the face, which actually measures four inches from the centre of the nose to the chin, as seen by the divisions in Fig. 3, not only loses about a quarter of an inch in natural perspective by reason of the change in the point of view, but loses still another quarter inch by the steepness of the view angle. Few people have jaws of sufficient prominence to be able to afford this loss without giving an exaggerated suddenness to the chin. It should be remembered that the decrease in size in any slope in any part of a subject gives the impression of increase of distance in that slope, while an enlargement of the image of the slope tends to make the part appear more upright instead of slanting. If reference is made again to Fig. 2, it will be seen that a figure whose foot is in advance of the line B C will have that foot and that portion of the floor larger in size (in the photograph) than it should be, and the slope of the boot and of the floor will appear to run downwards instead of towards the observer, while as we go back behind B C such slants as are in the subject or in the background will be reduced in size and will give the effect of much greater distance still by reason of the unduly exaggerated foreground. This effect is common in the work of cheap studios, and an example analysed will show the rapid diminution of background detail, coupled with great spreading of the feet and foreground.

Another point in the use of the long-focus lens—that is to say, of the distant view-point, does not affect the apparent perspective or distortion of the subject in the finished result, but is a great advantage to the operator. If we go back to the first or second diagram, it is seen how much of the background is hidden by the sitter when a near view-point is taken and how the remaining margin is dwarfed in size. For this reason the user of a short-focus lens has to place his sitter in the centre of his background, and can only just manage to include enough margin of the latter without showing its edges. By getting further away, one uses very much less of the background at a time, and for three-quarter-length figures and heads it becomes possible to ring over so many changes on one background by using different portions of it from various angles as well as straight on.

There is a simple method of explaining and proving my arguments far more convincingly than my diagrams, which it is not possible for me to carry out at the present time, but which any student of portraiture can arrange for himself. A light frame of wood or cardboard can be made, say not less than twelve by ten inches inside measurement. Inches are marked on each side, and tacks or pins driven in on which to wind stout white or black thread so as to divide the opening of the frame into inch squares. This should be hung so that it can be adjusted to the height of the face of a seated person, and, getting someone to experiment on, take a few negatives of the head, with the squares in contact with the face from different points of view—different, I mean, as regards distance as well as angle. Probably it would be best to leave out the horizontal thread in the centre to allow the nose to project and let the squares come in contact with the principal planes of the face.

When dry-mounting was first introduced, one of the strong points put forward in its favour was that it obviated the distortion in a likeness due to expansion of the print in the wet-mounting method. I hold that the apparent distortion due to a short focus lens by reason of the nearness of the view-point it compels is a good deal worse than any that may result from stretching of the prints.

D. CHARLES.

FORTHCOMING EXHIBITIONS.

October 14 to November 30.—Royal Photographic Society. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

November 9 to 16.—Manchester Amateur Photographic Society. Hon. Secretary, Walter Johnson, 30, Hartington Road, Chorlton-cum-Hardy, Manchester.

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CITY OF LONDON AND CRIPPLEGATE PHOTOGRAPHIC SOCIETY.—The winter session will open on Monday, November 18, with a lantern lecture by Mr. C. Forbes, entitled "The Romance of Old London." Any of our readers will be welcomed. The meeting starts at seven o'clock, and will terminate about 8 to 8.15. The society's programme of demonstrations and lectures includes those by S. Brigden, J. Dudley Johnston, R. H. Lawton, F. W. Slater, B. C. Wickison, G. B. Clifton, and others. The membership fee is 7s. 6d. annually, and particulars will be forwarded to any person desiring to join.

MR. ARTHUR C. GUNDRY notifies us that he is removing his business from Rickmansworth. His new premises are not yet obtained, but in the meantime enquiries should be addressed to him at Croft Studio, East Street, Seaford, Sussex.

DYES IN PHOTOGRAPHY.

(The current issue of the French newly established chemical journal "Chimie et Industrie," which is the organ of the French Society of Industrial Chemistry, contains a communication by Dr. A. Seyewetz which usefully reviews the various applications of artificial colouring matters to photographic processes. Inasmuch as Dr. Seyewetz gives in a good deal of detail particulars of the dyes which are employed for various photographic operations, the translation of part of his paper, which is given below, is of interest. That portion dealing particularly with the dyes employed in colour processes will be published in the "Colour Photography" Supplement.—Eds. "B. J.")

The modern artificial colouring matters, the use of which is of importance to a large number of industries, in particular, those of dyeing and printing on textile fabrics, have a considerable variety of applications in photography, and the progress of photography in monochrome as well as in colour owes a good deal during the past few years to this branch of purely chemical manufacture. The several purposes for which dyes are employed in photography may be stated as follows:—

In orthochromatic photography.

In the preparation of non-halation plates.

In colour photography by the triple superposition method, in the making of colour-screen plates, in processes depending upon the production of colours from colourless substances by the action of light, and in those based upon the bleach-out action of light upon dyes.

Tinting of cinematograph films and safelight papers.

Orthochromatic Photography.

As is well known the negative obtained on an ordinary photographic plate is a false rendering of the action of rays of light of different colours. In the absence of special means, yellow, orange, and red are reproduced as exceedingly dark tones in the photographic print, whilst blue and violet are represented by very light tones. A white drawing on a blue ground or black on red might thus yield a photographic copy consisting of one uniform tone in which none of the details of the design would be visible. Inasmuch as the relative sensitiveness of photographic plates can be modified in order to yield photographic renderings comparable with those perceived by the eye, the disabilities of the ordinary plate may be avoided by such orthochromatic or isochromatic preparations. The addition to the photographic emulsion of certain colouring matters effects a displacement of the actinic action of light, and imparts to these preparations very considerable sensitiveness to rays of the greater wave lengths. At the present time, certain dyes are used which effect such a preponderating sensitising action for yellow and green rays in comparison with violet that the sensitive plates can be employed without a compensating light-filter such as is ordinarily used to cut down a certain proportion of violet rays. The sensitising action does not, however, correspond exactly with the absorption spectrum of the dye.

Only a small number of colouring matters possess these sensitising properties, these dyes exerting their sensitising action when present in very small quantities. Some of them act in so small a proportion that the sensitised plate possesses no visible colouration, appearing colourless to the eye. The dyes cannot be chosen as can those for the purpose of making coloured screens, that is to say, by the examination only of their absorption spectrum, although the optical sensitising takes place in consequence of the plate with which dye has been incorporated, absorbing the rays for which the plate is sensitised. There are, in fact, dyes which sensitise for rays different from those which their solutions absorb; for it must be assumed that the dye possesses sensitising properties only when it is able to form a compound with the silver salt analogously to the formation of a "lake." In this case it is the absorption spectrum of this compound which is the effective agent, and not that of the solution of the dye.

The examination of the absorption spectrum will thus give only very approximate indications of the colour-sensitising properties of the dye. Very dilute solutions of the dyes, so dilute as to exhibit no perceptible absorption, to the eye, nevertheless, are capable of exercising a pronounced sensitising action. The feature which distinguishes a true colour-sensitising dye from one which acts simply as a screen is that the former exerts its action in these minute quantities and, therefore, without colouring the emulsion; also it gives rise to no reduction of the sensitiveness, and, consequently, does not call for an increased time of exposure. The sensitising power of a dye can only be determined experimentally by photographing a spectrum on a sensitive plate impregnated with the dye to be tested.

Dyes Used as Sensitisers.

The principal classes of dyes among which are to be found colour-sensitisers are the derivatives of diphenylmethane, triphenylmethane, acridine, and phenyl-acridine and quinoline. There are, moreover, dyes belonging to other classes which exert a sensitising action only when reducing at the same time the general sensitiveness. These dyes possess a very limited practical interest. The various dyes, according to their chemical constitution, produce sensitising action in the different parts of the spectrum, but none of them, whether employed alone or in admixture in variable proportions permits of reproducing the spectrum with the relative value of colours perceived by the eye. Exceedingly effective sensitising can, however, be obtained for limited parts of the spectrum, such as the yellow and the green of one part, or for the red of another. By utilising these partial results, the employment of several dyes thus yields a sensitising effect greater for the red and yellow than for the blue and violet, but still without attaining the respective colour values perceived by the eye.

Sensitisers for Yellow-Green, Yellow-Orange, and Red-Orange.

The dyes of the phthalein class are the most important sensitisers for yellow and green. Eosine, erythrosine, and rose bengal are employed for the preparation of orthochromatic plates sensitive to yellow and green. Sensitisers for yellow and orange are the blue, violet, or red dyes. Quinoline red, rosaniline violets, more particularly ethyl violet, and the cyanines are employed for the sensitising of plates to red and orange. Lastly, certain cyanines permit of sensitising at one and the same time to orange and red.

The manufacture of orthochromatic plates has made important progress during the past few years owing to the discovery of a large number of new cyanine dyes, the original type of which is ordinary cyanine obtained by condensation with caustic alkali of equimolecular compounds of quinoline iodo-ethylate and quinaldine in alcoholic solution. By employing the sensitising properties of quinaldine quinoline ethyl-cyanine, Dr. Miethe provided the starting-point of work undertaken by various dye factories for the preparation of new cyanine sensitisers.

The lepidine-cyanine blues exert their sensitising action beyond C in the red of the spectrum, whilst the violet-red quinaldine-cyanines sensitise only beyond D ½ C in the orange.

The quinaldine-cyanines possess several advantages over the lepidine-cyanines, and as the sensitising into the red is a very desirable feature, attempts have been made to produce quinaldine-cyanines of bluer colour in order to increase the red sensitiveness. Dr. König has employed a whole series of substituted quinolines in order to obtain new cyanines, and has found that the iodo-methylates of quinoline and of substituted quinaldine (meta and para) yield bluer cyanines. Orthochrome T (para-tolu-quinaldine para-tolu-quinoline ethyl-cyanine) exerts its sensitising action not only in the orange, yellow, and green, but in the red. Pinachrome, pinaverdol and homocol are cyanines analogous to orthochrome. Ethyl-cyanine, pinacyanol, and dicyanine, discovered by Dr. König, possess notable sensitising properties. The two first sensitise into the red near the line B with a notable predominance of the orange and red relatively to the blue. Lastly, dicyanine produces sensitising into the extreme red, but without predominance over the blue.

The manufacture of dyes employed as colour-sensitisers has hitherto been the monopoly of a few German factories, but it can be readily undertaken, and at small cost, by French dye manufacturers, among the chemists of whom are undoubtedly those capable of discovering new dyes possessing sensitising properties superior to the substances at present in use.

Dyes for Non-Halation Plates.

Among the various means for the prevention of halation the most effective is the incorporation between the glass and the emulsion coating of a transparent red-orange or green film, or one of suitable non-actinic colour which absorbs all the rays after their reflection from the back surface of the glass. The dye employed for the colouration of this film requires not only to possess a suitable absorption spectrum, but should not diffuse into the emulsion and so reduce the sensitiveness of the latter. Moreover, it requires to be readily decolorised in order not to obstruct the operation of printing from the finished negative. Only a few dyes fulfil these requirements among them Rosolic and Congo red.

Dyes for Cinematograph Films and for Safelight Papers.

The dyeing of cinematograph films for the purpose of producing various artistic effects is a development which consumes very considerable quantities of the colouring materials, either for uniformly tinting the whole film or for colouring only the image portion of it. In the case of the first process the bands of film stretched on frames and previously soaked in water are immersed in dilute solutions of the dyes, which generally are those of the basic type, moved about in these baths until the requisite depth has been secured, then rinsed and dried. The local colouring of films by means of a brush which follows the outlines of the image is a process which from its nature is one which can receive little industrial application.

Lastly, a use of dyes which cannot be passed over without mention is in the preparation of the transparent papers of red, green, or yellow colour employed as safelights. These papers will in time replace the coloured glasses of dark-room lamps, inasmuch as they possess distinct advantages over the latter. Apart from the avoidance of any risk of breakage the colour can be chosen so as to obtain the maximum luminosity for the eye and the minimum of actinic effect upon the sensitive materials. Also by the use of these papers in a greater or lesser number of assembled sheets the illumination can be readily varied in any desired way and the safelight thus readily compounded in accordance with the strength of the light and with the special sensitiveness of the material which is being handled.

It will thus have been seen that dyes are employed in many numerous applications in photography, but at the same time it is to be noted that the properties which are acquired in these various photographic uses are different from those demanded in the dyeing of textile fabrics where, apart from the brilliancy of the colour, the permanence of the dyes towards physical and chemical agents is the chief consideration. The special qualities which dyes for photographic purposes should possess are thus even now very imperfectly realised. There is ample opportunity for manufacturers to demonstrate their enterprise in the production of new products. These latter, even though they may be of no service in the dyeing of fabrics, will be assured of securing a considerable demand. The consumption of them may not be comparable with that of the substances employed in dyeing, but their relative high price should compensate in a measure for the lesser scale on which they are used, and should lead to the establishment of an interesting branch of dye manufacture.

A. Seyewetz.

Exhibitions.

PICTURES BY SIR FRANK SHORT, R.A., AT HAMPSHIRE HOUSE.

An exhibition of great beauty and educational value is now to be seen at Hampshire House. The works shown are in some of the media employed by the talented and versatile artist, Sir Frank J. Short, R.A., President of the Society of Painter Etchers.

Although none of his water colours are included, representative examples of etching, mezzotint, aqua-tint, and dry-tint may be seen and studied upon the walls. There are three dozen pictures, about half of which are originals, including Sir Frank's Academy picture of this year, an aqua-tint entitled "The New Moon." Other specimens of interest are engravings for the completion of the "Liber Studiorum," and one or two other mezzotints after Turner of a more ambitious character. Among the portraits the world-famous reproduction of Vestier's Madame de Lamballe—the unfortunate friend and confidante of Marie Antoinette—is here. But even among so many lovely pictures the arresting beauty of the mezzotint, Diana and Endymion, after G. F. Watts, appeals perhaps most strongly.

The exhibition is open every day for the next month. Visitors are cordially invited.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, September 16 to November 2

Plates.—No. 15,794. Manufacture of photographic plates and pictures. J. H. Christensen.

Lenses.—No 15,106. Lens adjusting devices for photographic cameras. H. A. Gile and International Patent Licensing Corporation.

Cameras.—No. 15,184. Photographic cameras. J. P. Hansen.

Developing Apparatus.—No. 15,185. Combined apparatus for developing, fixing, and washing photographic films or plates. J. P. Hansen.

Photo-Micrography.—No. 15,207. Photo-micrographic apparatus. C. W. Ross.

Apparatus. — No. 15,828. Photographic apparatus. G. Garbagnati and E. Zamperti.

View-finders.—No. 15,505. View finders for cameras. H. B. McCallum.

Cameras.—No. 15,476. Photographic cameras. R. S. McConnell.

Print-dryers.—No. 15,521. Machines for drying photographic prints. S. H. Morse.

Enlarging.—No. 15,914. Daylight enlarging, reducing, and printing apparatus. J. G. Brown.

Shutters.—No. 16,218. Lens-shutters for photographic cameras. J. P. Hansen.

Cameras.—No. 16,484. Photographic cameras. R. S. McConnell.

Lenses.—No. 16,630. Photographic lenses. A. A. Smith.

Aerial Photography.—No. 16,540. Photographic cameras for aircraft. C. M. Williamson.

Colour-sensitive Emulsions.—No. 16,845. Colour-sensitised photographic materials. O. Bloch and F. F. Renwick.

Printing.—No. 16,755. Photographic printing. Marchant and Co.

Developing Apparatus.—No. 16,969. Apparatus for developing, washing, and drying photo-prints. L. Shaw.

Film Envelopes.—No. 17,255. Photographic film envelopes. J. P. Hansen.

Films.—No. 17,191. Photographic films. I. M. Kelley.

Changing Boxes. No. 17,954.—Change boxes for photographic cameras and developing tanks therefor. D. Brower.

Shutters. No. 17,759.—Photographic shutters. A. H. F. Perl.

Dark-slides. No. 17,862.—Dark-slides for cameras. A. G. Pickard, F. Slinger and Thornton-Pickard Manufacturing Co.

Under-Sea Effects. No. 17,667.—Tank and method for producing photographic under-sea effects. F. D. Williams.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Print Washers.—No. 118,743. (November 14, 1917.) The novel feature of the washer is the provision of several differently placed jets of water the successively repeated action of which keeps the prints in constant movement. This is done by means of a multiple-way tap to which several pipes leading to the jets are connected, the tap being operated by the up and down movement of a ball float contained in a tank with a siphon outflow.

Water enters through a pipe (1) and passes by a side tube (2), controlled by a tap (3), into a tank (4) placed above the tank (5) in which prints are washed. The tank (4) is fitted with a discharge siphon (6), the tank refilling at a rate controlled by the opening of the tap (3).

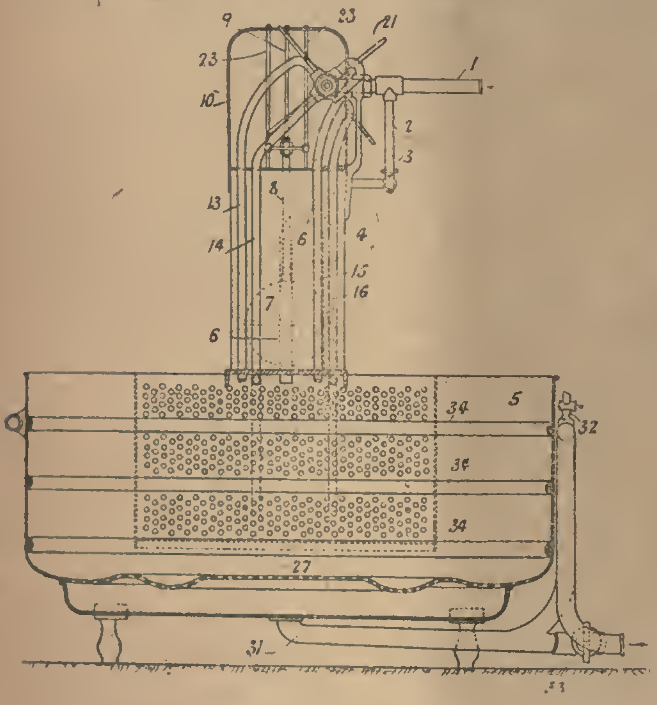

Fig. 1.

In the tank is a ball float (7), which falls as the tank empties. Projecting from the float is a tube (8) moving up and down with the movement of the float and guided by an upright rod. This tube operates a four-way tap, shown in Fig. 3.

The key (11) of this tap is hollow, and is formed with an annular series of perforations (17) in communication with an annular groove (18) in the barrel (12) of the tap into which water enters from the pipe (1), Fig. 1. Formed in the key (11) is an elongated perforation (19) which, when the key is rotated, registers successively with four circular perforations in the barrel (12), through which perforations water passes successively by the pipes (13, 14, 15, 16).

Four arms (21) are fixed to the key at right angles to one another, and successively turned by a trigger (22), Fig. 2, hinged to the tube (8). Thus when the float (7) rises the trigger (22) pushes the arm, and with it the key, through a quarter of a revolution. As the float falls, on the tank emptying, the trigger, owing to its hinge, passes the next, but operates the next when the float rises again. In this way four successive up and down movements of the float turn the key through one complete revolution.

The four pipes (13, 14, 15, and 16) from the tap deliver water to the vessel (5) in which prints are washed. Pipe 13, from the first way of the tap, is led into a pocket (24) outside the basin (5), and is fitted with two nozzles (25) (for small sizes of apparatus one nozzle may suffice) located, say, about one inch and three inches, respectively, beneath the water level in the basin, said nozzles (25) being arranged to direct their jets tangentially of the basin. The basin communicates with the pocket by way of perforations in the side of the basin, and the nozzles are so arranged that, without themselves projecting or protruding, they direct their respective jets directly through individual perforations. In addition to the nozzles (25) an additional nozzle or outlet (25^1) is provided at a depth of, say, two inches from surface level, the jet from which additional nozzle is directed substantially radially through an individual perforation with the object of assisting to prevent adhesion to prints, etc., to the perforated side of the basin whilst the tangential jets are in operation.

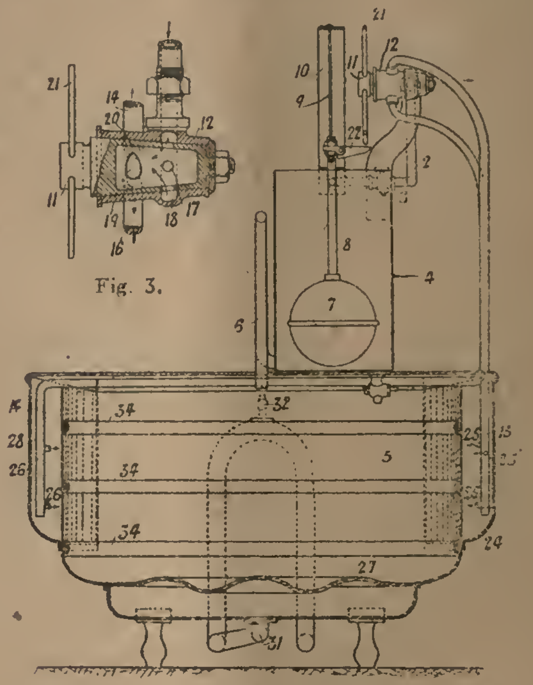

Fig. 3.

Fig. 2.

Pipe 14, from the second way of the tap, is provided with two nozzles (26), or it might be a single nozzle, located about one inch and three inches, respectively, above the perforated inner bottom (27) of the basin at a point angularly spaced from the nozzle (25). The jets from the nozzles (26) are directed, not quite radially, but rather eccentrically, so as to impinge upon the opposite side of the basin and cause prints, etc., contained in the basin to be carried towards the point whence they will be driven by the next flow from the opposite tangential jets. The stopped end of the pipe (14) and the nozzles (26) are contained within a pocket (28) similar to the pocket (24), and also in communication by way of perforations in the side of the basin with the interior of the basin, and the nozzles direct their respective jets directly through individual perforations.

Pipe 15, from the third way of the tap, is led to the pocket (24), and is provided with tangentially directed nozzles facing in the opposite direction to the nozzles (25). An additional nozzle directs a small jet of small volume substantially radially and through an individual perforation.

Pipe 16, from the fourth way of the tap, is led to the pocket (28) and provided with nozzles which direct jets converging towards the nozzles (26).

The siphon pipe (6), by way of which the contents of the tank (4) are discharged, is directed towards and over the centre of the basin, and furnishes in effect an additional jet.

The basin is drained from the bottom by a waste pipe (31), which is fitted at the highest point with a cock, and may be arranged to act as a siphon or overflow, according as the cock is closed or open.

To prevent prints from getting into the pipe (31) the basin is formed with a double bottom, of which the inner member (27) is perforated and formed with an undulating surface—with the object of assisting and separating and turning over prints that may tend to sink, and of creating additional eddies.

34 denotes internal ribs on the side of the basin presenting smooth convex surfaces, so that prints cannot adhere closely to the side of the basin and so close the perforations therein.—Peter Hugh Waddell, Troon, Ayrshire.

Trade Names and Marks.

MARKS PLACED ON THE REGISTER

The following marks have been placed on the register:—

Measure Brand Design.—No. 382,365. Chemical substances prepared in Great Britain for use in photography. White Band Manufacturing Company, Limited, 121, Selsdon Road, South Croydon, Surrey, manufacturing chemists.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, November 16.

Manchester Amateur Photographic Society. "The Story of Venice." B. L. Coulthurst.

Monday, November 18.

Bradford Photographic Society. "Roman Roads in the North of England." P. Ross, A.M.I.C.E.
Dewsbury Photographic Society. "Self-Portraiture by Flashlight." L. A. Dawson.

Tuesday, November 19.

Royal Photographic Society. "Personal Practice in Lantern-Slide Making." J. Dudley Johnston.
Manchester Amateur Photographic Society. Discussion on Members' Exhibited Work. Monthly meeting.
Halifax Scientific Society (Photographic Section). "Developing." B. Wadkin.
North Wilts Field and Camera Club. 1917 Prize Slides, "Amateur Photographer" and "Photography."

Wednesday, November 20.

Croydon Camera Club. "Two Great French Cathedrals." E. W. Harvey Piper, F.S.A.
Leicester and Leicestershire Photographic Society. R.P.S. Competition Prints.

Thursday, November 21.

Brighouse Photographic Society. "Amateur Photographer" Prize Slides.
Huddersfield Naturalist and Photographic Society. Exhibition of Members' Slides for Criticism and Selection for the Y.P.U.
Hammersmith Hampshire House Photographic Society. "Round about Borrowdale in Winter." W. Rawlings.
Rodley and District Photographic Society. Members' Night.
Liverpool Amateur Photographic Association. "Some Optical Illusions." W. Hewitt, B.Sc.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, November 12, Mr. F. F. Renwick in the chair.

A paper by Mr. Jas. C. Kingden on "The Causes of the Variation in the Watkins Development Factor" was read by the secretary. The author's aim had been the finding of the explanation of the well known fact that certain developers, such as metol, very quickly produce a visible deposit upon an exposed plate, whilst others, like hydroquinone, are much slower in producing a corresponding effect. The few experiments described by the author as having been made in investigating this problem consisted in placing glass tubes filled with gelatine jelly mouth downwards in a solution of the developer and noting the time taken for the developer to diffuse upwards through the jelly, a strip of bromide paper contained in the jelly serving to indicate the progress of the diffusion of the developer into the jelly. The results obtained with different developer in this way did not exhibit sufficiently wide differences to account for the variations in the times of appearance of image exhibited by the different developing agents. The author, in a train of speculative reasoning, then fell back on a hypothesis of "critical concentration" for the explanation of the known facts.

His paper was followed by a discussion in which Captain Slade, Messrs. W. B. Ferguson, Olaf Bloch, F. W. T. Krohn, A. E. Leiboshez and the chairman took part.

CROYDON CAMERA CLUB.

Dr. G. H. Rodman, F.R.P.S., a valued friend of the club, gave a lantern-lecture last week on "The Floral and Faunal Remains Found in the Coal Measures." It was rendered all the more interesting by its being a sort of sequel to a previous lecture on the manufacture of coal gas. A large number of splendid slides depicting the remains were shown, some of which illustrated that Dame Nature had anticipated Mr. Coburn's weird "Vortographs" in results, if not in methods. Coal, Dr. Rodman said, is a product of the vegetable *débris* formed from the shedding of leaves, fronds, and spores of the primeval forests existing many thousands of years ago. Under the influence of heat, moisture and pressure from superimposed strata the peaty material became compressed into comparatively thin layers, and in the course of years got gradually depressed.

A feature of the evening consisted of the terrible tongue-twisting titles of the varied examples. Even a bargee, with tow-rope badly fouled, in a vocabularic sense would be incapable of standing up to the doctor if subjected to a full blast of descriptive coal-bed language. Some members, possibly of latent bargee temperament, dimly perceived this, for after being bombed with such exquisite epithets as *Stauropteris*, *Burntislandica*, and *Mesoxylon ponocyloides*, only a murmur once or twice disturbed the air with—"Same to you!"

Dr. Rodman had a very good word for the Wellington Anti-Screen plate, which, unbacked, he considered almost halation proof. Considering that some of the sections photographed with an electric arc behind, from their nature, were of considerable opacity, fractures and fissures of practically clear glass might well be expected to have shown halation violently, but little or none was apparent. Another good word was spoken for the South Kensington Natural History Museum, the officials of which, he said, once convinced that serious work is contemplated, place every facility for study and research at the disposal of the applicant.

In the discussion Mr. Salt said his attention had been recently directed to coal through the medium of an ordinary type burner in the scullery. A powerful magnification would be required to resolve the illumination. The secretary and other big-wigs of the Croydon Gas Company were present, and all ought to admire their pluck in arriving without the fashionable white flag. The lanternist was also to be congratulated on furnishing a blue sky to nearly every slide. Mr. Reynolds said he was always ready to take any credit due to him for colour effects, but in the present case the blue-tinge was merely an automatic response by the lantern, evidently in sympathy with the language it had heard. Mr. Ackroyd stated with considerable truth that he was not an expert in lantern-slide making and inquired how the sections of coal were obtained; he had found rock sections difficult, but apparently these were child's play to brittle coal. The lecturer, in reply, said grinding such sections required long experience, and he left this part to those capable of doing it. The President, Mr. Catharine, in proposing a vote of thanks for a highly interesting and instructive lecture, complimented Dr. Rodman on his wide knowledge, which ranged from diatoms to gasometers. Mr. Keane, in seconding, said how much he had enjoyed the evening. On his return home he should firmly impress on his wife the desirability of considering the beauty of *Calamites* rather than worrying over forms relating to rationing its environment. One may speculate on the reply. Probably—"Don't talk rubbish, my dear, but go to bed!"

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

Mr. Bulloch's demonstration on "Improving the Print" was one which if up before a tribunal of photographic societies would be granted no exemption—not even a conditional one—but recruited straight away and graded A1.

The negative, the lecturer said, is very like an artist's sketch book; it records bare facts, facts which require to be reformed in the picture and subjected to some degree of control. Control, after all, is but an expression of individuality.

The real effect and feeling of sunshine in all its beauty and intensity is really difficult to record, and is rarely recorded in the negative—something is invariably lacking. The range of tones obtainable in a bromide enlargement do not—if not controlled—convey anything like a real impression of warm and intense sunlight. In fact the scale of contrasts is insufficient to convey a really truthful effect.

In order to increase the scale, it is necessary in the first instance to reduce the scale by over printing the bromide paper; this results in a flat print in a low key. If the high-lights are bitten out and made stronger, and the shadows strengthened, a greater degree of contrast is obtained and a very fine and strong picture will result.

The desired effect should be decided upon before any work is commenced upon the print; only those high lights which are to form the key of the picture should be dealt with, and these can be emphasised at will.

By this means of control, the interest can be concentrated and the light thrown in one direction. High-lights in sun pictures should always be the key or centre of interest.

Reduction by ferricyanide and hypo is unquestionably the best method. Some workers complain of stain, but this could be eliminated by the use of a very weak solution and the immersion of the print in a fresh hypo bath after the control work is finished. Of course the print must be thoroughly washed; if both these operations are fully carried out there will be no further action on the part of the reducing agent.

Cream crayon surface bromide gives quite good results and is less likely to show any staining.

The materials, etc., required are few, simple and inexpensive, a few quill brushes and some hypo, these, together with a sponge and a crystal of ferricyanide, complete the outfit. Brushes with tin ferrules should be avoided, likewise tin or metal containers for the reducing agent, otherwise blue stains will result.

An empty pan from a box of water colours should be half-filled with water and a piece of hypo dissolved therein, the ferricyanide crystal should be laid on the back of a discarded negative, the brush dipped into the hypo solution and just brushed lightly over the ferricyanide. The reducing solution is best used in a very weak form, two or three applications are far better than one which removes more than is desired.

When working on large prints it is a distinct advantage to scrub the surface with a piece of sponge and some soapy water, this helps the reducer to act in a more regular manner.

The print should be surface dry if the reduction is to be confined to any definite area, but the print must be treated as above and blotted off if really good results are required.

If it is desired to work upon a very small area a small brush should be used, and after applying the reducing agent a wet sponge should be passed over the area treated to prevent the action going too far.

The biting out must be consistent with the actual lighting and direction of the light.

Amyl acetate plus oil pigments is a good medium and has one advantage over all others, the pigment sinks into the image and leaves no mark to show that it is hand applied.

Rough surface papers are best suited for this method, but smooth grades take quite kindly to this particular treatment.

The medium should be applied by means of a brush, and only a very small quantity used, going over the portions it is desirable to increase in depth.

Good substitutes for amyl acetate are spirits of turpentine or petrol.

Old flat bromide prints can be revived and made into pictures by the methods advocated by Mr. Bulloch, and irritating masses of foliage against a white sky can be toned down by the application of a slight film of medium.

The South London Photographic Society is endeavouring to teach its members many useful side lines and photographic dodges, and each demonstration is being followed up by a special competition. This gives the members interested an opportunity of trying their hand at new methods in conjunction with other keen workers, with the result that a decided improvement in attendance has come about, and many applications for membership have been received from both professional and other photographers.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

The fifth meeting of the Edinburgh Society of Professional Photographers was held at Messrs. Dowell's Rooms, George Street, on Monday, November 4. Present were: Mr. Young (in the chair), Messrs. Paterson, Johnston, Lauder, Swan Watson, Ferguson, Laing, Yerbury, Bambrick, Campbell Harper, and Moffat; and Miss Gray, Miss D'Arcy, Miss Roberts, and Mrs. Parken.

Regarding the retouching class, Mr. Young intimated that he had communicated with the Art School authorities, who seemed very sympathetic with the scheme. The matter would be considered at the next meeting of the Board.

The proposed rationing of photographers' light was then discussed. It was pointed out that the 25 per cent. reduction would be very awkward for those who had been economical in the past. The matter was generally discussed, and it was decided that it would be better to await developments, when a special meeting could be called, if necessary, to consider the question.

The proposal for the forming of a co-operative printing room in Edinburgh was then discussed. Numerous difficulties which would arise from such a scheme were pointed out, such as the heavy liabilities which would immediately be incurred by the engaging of an expert printer in each of the different processes required; the doubtful support which the scheme might receive, almost whole-hearted support being necessary for its success; and the adverse effect which a scheme of this kind, if successful, would have upon the present trade-printing establishments in the city. On the other hand, it was agreed that considerable benefits would accrue in the saving of time, worry, and money. The financial side of the question was then dealt with, and it was shown that the most equitable method of conducting the scheme would be to pay—first, a fixed interest on the capital to all shareholders; and, secondly, to divide the remainder of the profits in the form of a discount according to each member's yearly account. The gross charges for all work done would approximate to the current trade printing prices, but only those belonging to the company would have the right to employ its services.

It was, of course, appreciated that, in the present state of affairs, the scheme could not be launched, but it was felt that discussion of the matter was both right and useful, and that it could be placed on one side until circumstances would permit of its being materialised.

With regard to the holding of a professional exhibition in Edinburgh, the rooms of the Society of Eight, in Shandwick Place, were mentioned as being suitable, and Mr. Young was requested to inquire as to the terms, so that a report of the cost could be submitted.

The meeting then closed.

Sheffield and District Professional Photographers' Association.—The usual monthly meeting of this association was held on November 6, at Stephenson's Café. Probably owing to the epidemic of influenza in the town, the very poor attendance of seven persons has to be recorded. Subscriptions were received and a tentative programme arranged for lectures and discussions at future meetings. Mr. Duncan will enlighten the members at the next meeting as to "How to save on your plate bill." All proprietors and managers within a twenty mile radius of Sheffield are eligible as members, and are cordially invited to attend. The next meeting of the association will be in Stephenson's Café at 7.30 p.m. on December 4.

Leicester Photographic Society.—At the weekly meeting held on Wednesday, November 6, Mr. A. Newton gave a most interesting demonstration on "Improving the Negative." Mr. Newton, who is active photographer in Leicester, is a past master at g, and few negatives are past recovery when he takes them in d

first of all showed how to produce a fine print from a badly- d negative. The result was equal to a print from a first-class tive. His best performance was transferring the film from a negative and replacing it on a clean glass in as good a con- as it was originally. He first of all immersed the broken plate lution made by adding 1 dram of fluoride of sodium to 5 ozs. ter. This requires at least five minutes to act properly. The e was then transferred to a dish containing 1 dram of sulphuric to 5 ozs. of water. Five minutes was again allowed for this The film was then taken off quite easily and placed on a ther larger than the original negative.

ommercial & Legal Intelligence.

NEW COMPANIES

itish **Photographic Plates and Papers, Ltd.**—This private y was registered on November 1, with a capital of £10,000, in es. Objects: To carry on the business as indicated by the The subscribers (each with one share) are:—H. W. Brown, Cottage, Owlsmoor, near Camberley, Surrey, clerk; E. F. 38, Solon New Road, Clapham, S.W.4, clerk. The directors be appointed by the subscribers. Solicitors: Ashurst, Morris, and Co., 17, Throgmorton Avenue, E.C.

News and Notes.

r as we go to press news reaches us of the death on Saturday Mr. A. L. Adams, the well-known maker of photographic and accessories, of 24, Charing Cross Road, London, W.C. t postpone further obituary reference to Mr. Adams until issue.

ath of **Mr. Osmund R. Green.**—One of the oldest amateur graphers in the kingdom has passed away in the person of Mr. d R. Green, for many years—back to the end of the fifties of t century—a prominent member of the Liverpool Amateur graphic Association. He filled the office of President in 186 a very leading part in the furtherance and development of and science of photography. Mr. Green's interest in the n was maintained till the last, and he was in frequent dence with the hon. secretary until lately. He presented ation a remarkable camera and lenses, together with a mber of his negatives. The beautiful carbon transparencies club room windows were made from his negatives.

Illingworth Warrior.—An interesting ceremony took place at the works of Messrs. Thomas Illingworth and Co., photographic paper makers, Park Royal, when one of their , Rifleman E. Clements, M.M., was presented with a wrist and a sum of money from the firm as a token of esteem on n of his winning the Military Medal. On Monday Rifle- ments left for France, but was recalled by telegram to the presentation of his medal at Hounslow Barracks at the of Major Dewhurst. He received the Medal for particularly and courageous conduct, officially described as follows:— gallantry and devotion to duty during the fighting La Pannerie on April 22, 1918. This man laid a telephone line Battalion Headquarters to an advanced report centre on the bank under very heavy shell fire, and, in spite of an intense ardment in the afternoon, he repaired the line whenever cut, keeping the Battalion Headquarters in communication with the ne companies during the whole of the operations. Whenever found impossible to get into communication with the report he went out at once on his own initiative, never failing to r the line on any occasion. His pluck and determination are y of the highest praise.'

r **Deposition of Silver Films on Glass.**—The purpose of a t investigation was threefold—to produce the best mirrors , to secure the highest possible percentage deposition, and, ible, to obtain these results at room temperatures.

In hot processes cane-sugar is the most satisfactory reducing agent. Other sugars give good results, but no better than cane-sugar. The tartrates are not as satisfactory as the sugars. A rapid cold process was developed. It requires a batch of the following proportions, used as indicated:—20 c.c. of 0.2 molar silver nitrate solution are mixed with 0.5 c.c. of 80 per cent. methyl alcohol; to this 0.5 c.c. of 40 per cent. formaldehyde is added, and the whole mixed thoroughly.

A slow cold process was developed, which is based upon the following principles:—(1) Low concentration of the reducing agent (formaldehyde) gives the best results. This helps lengthen the time of reaction. (2) Low concentration of silver nitrate gives high deposition percentages. (3) Sugar added to the solution in sufficient amounts controls the action of the formaldehyde in such a way as to produce even mirrors. It also lengthens the time of action. (4) Alcohol added to the solution results in a high deposition efficiency. By grouping these principles the following batch results:—16.5 c.c. of 0.037 molar silver solution; 1.0 c.c. of 1.000 molar cane-sugar solution; 0.5 c.c. of 80 per cent. methyl alcohol; 2.0 c.c. of 0.8 per cent. formaldehyde solution. Total, 20 c.c. After 40 minutes, over 20 per cent. of the total silver deposits as mirror in each case, and if left longer a heavier mirror results. The cost of materials is not over 1 cent per square foot, and 11 cents per square metre of surface silvered. The mirror is very firmly attached to the glass, for two reasons: (1) The temperature of the glass and solution is the same, as a result, deposition is more uniform than that which occurs at higher, more difficultly controllable temperatures. (2) Since deposition takes place at room temperature, differences in coefficient of expansion do not cause the newly formed mirror to be loosened from the glass, as may be the case where hot processes are employed.—A. Silverman and R. M. Howe ("The Journal of Industrial and Engineering Chemistry, vol. 9, No. 11, p. 1032.)

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

TO YORKSHIRE PHOTOGRAPHERS

To the Editors.

Gentlemen,—I have followed with considerable interest the various reports you have published re The Society of Master Photographers (Lancashire and District).

It is to be hoped other counties will follow the example. I certainly hope Yorkshire will do so, and would suggest that a few of the leading photographers of this county take the matter in hand and the result would, I am sure, be gratifying.—Yours faithfully,

The Studio, **Maurice W. Medcalf**
Mexborough, Yorks.,
November 11, 1918.

MATTERS OF PROFESSIONAL MOMENT.

To the Editors.

Gentlemen,—I would like to say that Mr. Chapman has put things far more completely and clearly than I was able to. I once thought of starting a club on the lines he advocates, but the war came and scattered and upset all my professional acquaintances, so I let it drop. I intend, however, to try again when things get cool. Needless to say this will only be a small affair and not in any way opposed to any existing society; to start with, in fact, it will only be a kind of "pally" club.

In reply to "Diogenes"—if his ill-natured sneers are worth a reply—I could disillusion him (and others too) of the idea that we outsiders only remain on the earth by grace of the five bobs of the faithful. He should come out of his tub and look around. Truly the apostles of common sense and good fellowship are not going to change their spots for the "dog in a kennel" views of a prehistoric cynic—the original Diogenes. I congratulate the writer on his pen name and the P.P.A. on their eloquent champion.

Small Pro.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent Internationol Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of generol interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

B. B.—For Hampshire application should be made to Director of National Service, 84, Westbourne Terrace, Paddington, W.

R. J.—We have never heard of the solution you mention being added to the developer. It makes an excellent intensifier. Can you give any reference to where the formula has appeared.

F. A.—If you have taken the views yourself the copyright is your property, without any formality in the way of registration, etc. If, however, the views have been taken by somebody else, then you require to have the copyright transferred to you in writing.

O. W. H.—Most of these back numbers of the "Photo-Miniature" series are obtainable, but it will be necessary for you to obtain them direct from Messrs. Tennant and Ward, 103, Park Avenue, New York, U.S.A. The price is one shilling per copy, remittances to be made either by international money order, coupons, or (in the case of a single copy) penny stamps.

G. T. H.—So far as negatives are concerned we have no hesitation in recommending you to use the permanganate hypo-eliminator according to the directions which we have published in the Almanac. But as regards prints, our feeling is that there is no satisfactory substitute for washing in plain water by hand—that is to say, the individual transfer of prints from one dish of water to another, repeated, say, seven or eight times.

E. P.—Your trouble is, as you suppose, due to the water being too hard. We should recommend you to try soaking the prints in water which has been softened with "Anti-Calcaire" (obtainable from Messrs. Maignen, Regent Street, London, W.), or similar preparation; the length of soaking necessary must be found by experiment. Does the trouble occur with all makes of paper? If not, it is probably due to some change in the gelatine.

T. H.—So far as we know, there is no way of softening outlines of a negative which has had the background scraped away. The only thing you can do is to work up the sharp edges on the prints; a good spotter could do this easily. With regard to the vignettes, these are usually done with an opaque, such as Photopake, put on thickly with a brush, and the edges softened off by dabbing with the finger while the paint is wet. Some printers use water-colour, such as crimson lake, dabbed round the figure, and make use of a card vignetter to cover the rest of the margins. No varnish is necessary.

C. C.—If the former proprietors have no continuing interest in the business and you are opening entirely on your own, then it will be necessary for you to apply for a permit to the Director of National Service, New Arts Building, Liverpool University, Liverpool. Further, if the business is your own and you continue to trade in the name of the former proprietors, you will have to register under the Business Names Act. Forms of application for this purpose are usually obtainable from the local post-office, or can be had direct from the Registrar of Business Names, 59, Russell Square, London, W.C.

F. Jones and Co.—Like many other people, you are evidently sti unaware that it is not necessary to observe any formality, such a registration, in order to secure copyright. Copyright is automatically created by the creation of a work, whether a photograph, novel, or piece of music. Its ownership, however, in the first instance, depends on whether the author produces it "on his own," or is paid by somebody else. In the former case, the copyright is the author's; in the latter case it is the property of the person ordering the work to be done and liable for payment for it.

J. P.—Presuming that you took the photograph in the first place "on your own," the copyright is your property without any formality in the way of registration, etc. If the photograph was taken by you to the order of somebody else, or if it is a photograph taken by somoone other than yourself, then you require to have the copyright transferred to you in writing. As regards the fee which postcard publishers pay, it is usually not more than half a guinea to a guinea, which very often includes the negative. Higher prices, such as five guineas, are comparatively rare, and also, as a rule, a postcard publisher will only buy negatives if they are offered in sets of six similar subjects.

G. A.—As a general rule, a short-focus lens is necessary for flashlight pictures of dinners, and we should, therefore, advise you to use the Ross-Zeiss with an aperture of *f*/11; if you can get sufficient depth the camera should be placed rather high, so that you can look down a little. This will enable you to swing the top of the ground glass out, which all helps the focussing. Johnson's powder is as good as any, and particulars as to quantity needed are furnished with each box. A shallow tin dish about a foot long is all that is needed, and the powder is ignited with the touch paper supplied with it. Self-screened plates are not the best adapted for this work; the best negatives we have seen were made with Imperial flashlight plates. Remember the powder is highly explosive, and do not fire the flash near curtains or anything inflammable. You should have a rehearsal at home before you go to the job. More powder should not be mixed at a time than is necessary. The flash pan should be put above the camera and well to one side in order to avoid flat lighting.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully and correctly prepaid, senders of line announcements are asked to bear in mind this revised tariff. They will thus save themselves delay in the publication of their announcements.

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SUMMARY.

An article dealing with various solvents of gum, rubber, celluloid, etc., which should be of interest to those who wish to compound varnishes or retouching mediums, appears on page 523.

We reprint from our contemporary "Flying" an interesting article on the exploits of our military aerophotographers. (P. 526.)

The question of a minimum scale of prices for ordinary photographic work, with instances of the experiences of other trades, forms the subject of an article on page 522.

The functions of the Professional Photographers' Association and the question of the admission of assistants are discussed in a letter from a correspondent on page 531.

In view of recent developments in lantern illumination it is suggested that entire control of the lantern from a distance, including slide-changing, should once more occupy the attention of inventors. (P. 521.)

A brief report of a lecture at the Royal Photographic Society on his methods of lantern-slide making by Mr. Dudley Jonston will be found on page 530.

Elaborate arrangements for photographing the graves of soldiers who have fallen on the various fronts have been made. The position of nearly every grave has been recorded by the War Office, and the photography will be carried on at the expense of the joint War Committee of the British Red Cross Society and the Order of St. John of Jerusalem. (P. 531.)

Half-watt lighting, studio blinds, and copying and enlarging are amongst other matters mentioned in "Answers to Correspondents." (P. 532.)

The pros and cons of using a hand-camera at eye-level, together with some remarks on view-finders, are dealt with in a paragraph on page 521.

The ferricyanide reducer has recently been dealt with in our pages, but some fresh points, dealing principally with securing even action, will be found in "Assistants' Notes" on page 523.

An important note on the action of the acid fixing bath particularly upon pyro-developed negatives is given on page 522.

It is sometimes desired to remove the background from a negative in order to give a black surround. Alternative methods of doing this are given on page 522.

A method of obtaining lettering, together with the subjects on cinematograph films, is detailed on page 529.

EX CATHEDRA.

The Lecturer-Lanternist. With the prospect of a much more widespread use of the focus type of half-watt lamp as the illuminant in lantern projection, it is possible that we may witness a revival of attempts to provide a practicable means of controlling the succession of slides from the lecture platform. Patent literature of the 'seventies and 'eighties of the last century shows that the distance control of slides in the lantern was a subject which engaged the ingenuity of a considerable number of inventors. It would seem that by all of these the fact was overlooked that in the use of the illuminant then most commonly employed, namely, the oxy-hydrogen jet, the attention of an operator was required at pretty frequent intervals. And if the operator had to be there there was no earthly reason why he should not also effect the changing of the slides. But with the introduction of a high-power light-source which can be relied upon to be perfectly steady for an unlimited time the conditions are different. So far as concerns the projection of an even flood of light upon the lantern-screen the services of a lanternist can be dispensed with, and therefore there is a real opportunity for the design of an appliance by which a hundred or so slides could be caused to pass through the lantern-slide carrier by control mechanism connecting the lantern and the position of the lecturer near to the screen.

* * *

Eye-Level. Many photographers are not fully alive to the advantages of using a hand camera at eye-level. When working in crowded places the ordinary reflex pattern view-finder is almost useless; a higher standpoint becomes necessary, or the camera has to be held high, and more or less hit or miss methods employed. For work of this kind there is nothing to beat a light hand camera, fitted with a direct-vision view-finder, and this is, in our opinion, superior to the reflex inverted above the head, which is the only practicable plan when using this class of instrument. Moreover, in using a camera of the type described there is not the personal danger to the operator, as is the case when his view is totally obscured by the hood of a reflex. We know many photographers who place too much confidence on the accuracy of a view-finder, with the result that they produce negatives upon which the subject is badly placed. Even the best of direct-vision view-finders, perhaps excluding the wire-frame pattern, is only a very approximate guide to the actual position of the subject on the negative, and operators will be well advised to assure themselves that what they require is not only on, but well within the confines of the negative. A point that must be kept in mind when using direct-vision view-finders is that the finder does not actually occupy the same position as the lens, but is usually placed at a point some inches above, or to one side of the latter, as the case may be, and thus may give quite a wrong impression of the composition that is actually included by the lens. When working well away from the subject hardly any difference will result, but when working close up it is a good plan after the image has been sighted to cant the instrument a trifle up, or to one side, in order to allow for any difference that exists, the exact amount being easily found by actual trial. There is no doubt that the eye-level position for the camera produces a much more pleasing perspective than waist level, and is to be preferred.

* * *

Lantern Slides at the Theatre. We have commented on previous occasions upon the fact of the very inferior quality of lantern-slides exhibited in theatres and music-halls, but the observation of a number of particularly atrocious projected lantern-portraits of Entente personalities during last week constrains us to make the suggestion that there should be a reasonable amount of business to be done by photographers, who would supply the management of popular places of entertainment with topical slides of even reasonable quality. In one instance which came before our notice last week the projected portraits were so bad as to be absolutely unrecognisable, and it was only when a portrait was thrown upon the screen accompanied by a lettered title giving a clue to the identity of the original that any applause was elicited. Evidently music-hall managers are insensible to the defects of the pictures which they offer to their audiences, and it is clear that the establishment of a business connection with them would first of all demand clever and persuasive propaganda in order to convince them that the few shillings which they now spend per week could bring them transparencies which would not disgrace the other items of the entertainment offered by them to the public.

* * *

Black Background Prints. In the making of photographs for commercial use cases will be encountered every now and again in which a black surround suits the subject, and thus calls for the opposite of the customary process of blocking out. In such instances it is very rarely a practicable plan to cut away the emulsion film around the image of the subject, and one or other of two methods require to be followed. A positive transparency may be made from the negative, blocked out and used for the preparation of a second negative, which will, of course, possess the required clearness of ground. An alternative plan, but one calling for some previous experience, is that of reducing away the image of the background in the original negative by a chemical process. This latter method has the advantage that it can be adapted to deal with subjects in which the outline is soft in character, and can preserve the effect whilst wholly removing the image of the chief area of the ground. As was shown by Mr. D. Charles in an article in these pages of May 16, 1913, iodine solution used after coating the negative with collodion serves very satisfactorily as a reducer for this purpose. Nevertheless, the process is not one to be taken up until a few waste negatives have been used in familiarising oneself with the precautions to be taken.

* * *

Plain and Acid Hypo. An interesting point in connection with fixing was touched upon by Mr. Renwick in the course of a discussion at the Royal Photographic Society last week. It was that the acid hypo bath was found to fix more quickly than plain hypo in the case of negatives, the gelatine film of which had become clogged throughout its pose with products of oxidation of a developer such as pyro. The acid bath, owing to the fact that it exerts a solvent action on these products, which we take it are of the nature of stain, is thereby quickened in its proper function of rendering soluble the unaffected silver bromide in the film. It can thus be readily understood that in these circumstances the acid bath possesses the twofold advantage of more rapid fixation and more or less positive removal of developer stain. Under ordinary conditions, that is in the case of negatives free from anything more than a minute amount of developer stain, a plain solution of hypo without any addition has hitherto been shown to be the most rapid in its fixing action, and on the further ground of simplicity of its chemical behaviour is to be preferred wherever the anti-stain effect is not necessary.

* * *

Drying Negatives. One of the operations in the regular production of negatives which, as may be hoped, is likely to benefit in the execution of reconstruction measures is the drying of negatives. It is a curious thing that after nearly forty years of the dry-plate process the universal practice should still be that of drying negatives so that the wet and adhesive gelatine film is freely exposed to any floating particles of dust there may be in the surrounding atmosphere. Hitherto, so far as our observations have gone, improvements have been directed towards accelerating the rate of drying, resulting, of course, in the partial reduction of the period of exposure of the negatives to atmospheric dust and, therefore, a benefit apart from the saving of time. Perhaps the coming cheapening of electric current will be the means of promoting the supply of a complete appliance for the drying of negatives in which the necessary moderate heat and draught will be effected electrically by heating elements and a fan respectively. The same facilities are equally available where gas only can be had.

A SCALE OF PRICES.

Since the commencement of photography as a business the question as to what is a fair price to charge has exercised the minds of the fraternity, and much injury has been done because there has been no proper understanding on this vital point. In consequence of the war things have been somewhat improved; the great access of business and the increased cost of materials have enabled prices to be raised above the starvation level which was too general in most of the smaller businesses in the country. There can be no question of fixing a flat rate for certain sizes, because the superior character of the work or the reputation of the photographer will in many cases enable prices to be obtained which would be prohibitive to the great mass of the people, but there should be a minimum below which no self-respecting photographer should go and which the public would soon recognise as the lowest at which they could expect to obtain properly finished permanent work. As an example, we may mention the great revision of prices which has taken place throughout the hair-dressing trade in London. By virtue of forming a trade society, which issued a standard list of prices, the smaller practititoners have increased their charges from 60 to 100 per cent. as compared with those current before the war, and there is little probability that there will be any reduction in the near future.

Most price-cutting is due not to greed or a desire to take business away from a competitor but to a lack of confidence in one's own work, which gives rise to a feeling that the only way to secure orders is to execute them at a lower price than anyone else will. This is a suicidal policy and leads to disaster in every case, not only the photographer but any dealer who has been foolish enough to give him credit sharing in it. Those commencing in business are the most likely to make this error, and thus handicap themselves from the beginning when a fair return for their labour is most necessary.

It should be borne in mind that photographs are not every day purchases in a sense that bread, soap, tea, or other necessaries are, and that purchasers do not seriously regard the extra shilling or two that in the aggregate means so much to the photographer. Publishers have found that within certain limits the sale of a book is not affected by its price, and that if a volume cannot be produced so as to sell at five shillings and yield the usual rate of profit no loss of circulation will result from fixing the price at seven and sixpence. The same, we believe, would apply to photography; a raising of price from 20s. to 25s. per dozen would not appreciably reduce the volume of orders, while conducing greatly to the welfare of the photographer and his staff. We need not dwell upon the nefarious practice of "sweating" labour in order to cut prices. Labour has learned its lesson, and will not in the future co-operate in ruining itself.

It would appear that the local associations of photographers which are being formed in various districts will be able to do much to raise the standard in many directions. The spirit that is shown in the desire to get better trained assistants, to improve the quality of work all round, is truly admirable, and we trust that those who have started it will not allow their enthusiasm to abate. The mere fact that he is a member should make a man feel justified in putting forward an official scale of charges, and we are sure that any shortcomings in his work would be pointed out in a kindly way, and advice given by his fellow members if it were needed. As long as photographers keep aloof from each other they are apt to be jealous and suspicious, but when a dozen or so have met together once or twice it is surprising how quickly good fellowship develops.

It is not only the portrait man who needs to join an association. The outdoor and commercial worker will find it equally beneficial to his business, and in many cases will find that orders, which would have gone out of the district, can be secured by making himself known. We are, indeed, approaching a return to the old English system of guilds, when the practitioners of any art or industry formed a close corporation which regulated prices, guaranteed the quality of work done by its members, arranged apprenticeships, and looked after the interests of the craft in general. These guilds survive in a more or less active form in the City of London as "Companies," and are usually in public evidence only on Lord Mayor's Day, although many of them have made splendid contributions to the cause of technical education. We have the companies of Pattenmakers, Loriners, Horners, and many other moribund industries. Why not a Worshipful Company of Photographers, or something approaching it?

SOME EVERYDAY VOLATILE SOLVENTS USED IN PHOTOGRAPHY.

The writer presents the following notes as an epitome of current knowledge of the volatile solvents used in photographic and photo-mechanical work, put in non-technical language. This list of the properties of the solvents is given with a view to assist workers who have not time to make a number of tests of alternative agents. A perusal of the properties may help them to decide quickly which to choose for their purposes. For example, an experimenter wishing for a substitute for turpentine should not use the so-called turpentine substitute, for reasons which the article will show. In addition, the effect upon the health of workpeople is an important matter in choosing a solvent. Questions of stability of materials affect users largely. These are treated below as they arise. The list is not complete, but all solvents likely to be of use in regular work are described.

Turpentine.

Turpentine is the volatile portion of the sap of the pine-tree. Crude turpentine, or "gum thus," is placed in a vessel and distilled by forcing a jet of steam through the mass. The greater part of the distillate is turpentine, and the residue left in the vessel is colophony, or rosin.*

Turpentine is a good solvent for fats and resins, and exerts a drying action upon linseed and other drying oils. Its principal drawback is its tendency to become oxidised after keeping in stock, especially if light is allowed to act upon it. Oxidised turpentine evaporates very slowly and leaves a resinous residue, which is the cause of the "greasiness" often experienced in retouching mediums. Turpentine which has been oxidised until it has the consistency of honey is known as "fat turpentine," and is much valued by artists as a medium for diluting oil colours. "Rectified turpentine" has been redistilled. It is more volatile than ordinary turpentine, and generally leaves no greasy residue after evaporation. It, however, will oxidise if not carefully stored. "Venice turpentine" is obtained from the larch-tree, and possesses properties distinct from those of ordinary turpentine.

Naphtha.

Commercial naphtha, as retailed by oil chandlers, is usually a product of the distillation of shale. This kind can be identified by the fact that it has very little smell. Another kind of naphtha is simply crude coal tar spirit, but this variety is not easily obtainable at present. Shale naphtha is a good solvent for oils and most resins. It can be used in conjunction with methylated spirit in removing coatings of shellac varnish "acid resist," which resist the action of plain methylated spirit. Shale naphtha, however, is a rather unreliable substance, and a better dissolving agent for most purposes is

Solvent Naphtha.

This is distilled from coal tar. It is, perhaps, the best substitute for turpentine in photography. It leaves no greasy residue after evaporation, and dries at about the same speed as turpentine. This solvent ought to come into much greater use than at present in the manufacture of retouching mediums and the like. It is a healthy solvent to use, as the fumes have no bad effect upon the system when not over-inhaled. The name "solvent naphtha" comes from the fact that it is much used as an indiarubber solvent.

Benzole (Benzene).

This is also distilled from coal tar, and must not be confused with benzine, or benzoline, which is obtained from petroleum. Benzole is more volatile than solvent naphtha, but otherwise has practically the same properties. The regular commercial grade is called 90 per cent. benzole. Another grade is called 30 per cent. benzole. This begins to boil at about the same temperature as the former grade, but the bulk of it dries more slowly. "Commercially pure" benzole is a very pure solvent. The purest benzole, as used for colour-making, is known as "crystallisable."

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* "The name rosin for this body (colophony), must be distinguished from resin, which is the generic term for all this class of bodies."—Hurst.

Toluol occupies a place midway between benzole and solvent naphtha.

Xylol and cumol are obtained from solvent naphtha by re-distillation, and are very pure and consequently more costly than commercial solvent naphtha. They dry at about the same speed as solvent naphtha. Cumol has the highest boiling point of any coal tar spirit regularly procurable, and has on this account been used in the preparation of sensitive bitumen varnish for photo-process work. Sulphur is added to a solution of asphaltum in cumol, and the mixture is heated to about 135 deg. C., when the sulphur combines with the asphaltum, rendering it much more sensitive to light.

Benzoline.

This is distilled from petroleum. It is a poor solvent for resins, and should not be used for this purpose, or for retouching mediums. It is useful as a grease remover. As regards solvent properties, the same remarks apply to all petroleum spirits.

Petroleum Ether

is purified petroleum spirit. It bears no relationship to ether, and should not be confused with it. Chemically, ether is one of a distinct class of compounds which differ greatly from the petroleum series. The name is merely a commercial one. There are three grades of petroleum ether listed by dealers in chemicals, all equally pure, but with different boiling points. They are mainly used for analytical work, in the extraction of oils, etc. The grade with the lowest boiling point is most used for this purpose.

Petrol

is so well known as to need no comment here.

White Spirit, or Turpentine Substitute.

This is the least volatile of the petroleum spirits, the next fraction coming over from the still being light paraffin oil. Turpentine substitute does not replace turpentine entirely, but is often used to substitute part of the turpentine used in the manufacture of paint, hence its name. Used alone, it will not do the work of turpentine.

In general, petroleum spirit has a limited use as a solvent. It is principally used as a diluent or adulterant for other solvents, and when used in this way care must be taken that the petroleum spirit used is one that will evaporate more quickly than the solvent with which it is mixed, so that the physical properties of the original solvent are affected as little as possible. Resins dissolved in petroleum spirit are deposited as a granular mass on the evaporation of the solvent. If, however, another solvent is added, such as turpentine, which dries more slowly than petroleum spirit, the turpentine is the final solvent when drying, and the resin behaves as if dissolved in that fluid.

Sulphuric Ether, or Ethyl Ether.

This is a very volatile solvent which has a wide range of uses. Many organic substances which are difficult to dissolve yield to the magic touch of ether. Rooms where ether is in use should be well ventilated, as the fumes are of an anæsthetic character. They are also highly inflammable: no naked lights should be about, a precaution which applies almost as much to all the solvents here noticed. The term "sulphuric ether" is due to the method of preparation. Sulphuric acid is added to alcohol and heated, when ether is formed. There is no sulphur contained in the finished product.

Ether-Alcohol

is a favourite combination used by analysts. Its principal photographic use is in the preparation of collodion. It consists of a mixture of approximately equal parts of ethyl ether and alcohol.

Alcohol.

Ethyl alcohol, or spirit of wine, is sold in a number of grades, according to the amount of water present in the spirit. Absolute alcohol is almost pure, only containing about ½ per cent. of water. "Pure" or 90 per cent. alcohol contains 10 per cent. of water. Rectified spirit contains about 14 per cent. of water. "Proof" spirit is alcohol diluted with water until gunpowder will no longer ignite when moistened with it. Proof spirit contains about 51 per cent. of water. The most useful grade of alcohol for photographers is the pure or 90 per cent. It is occasionally cheaper to buy the absolute alcohol and to dilute it one's self. A little figuring is necessary on receipt of quotations in order to find out whether it is worth while.

Alcohol will dissolve rosin, shellac, and a few of the resins. It will dissolve castor oil, and most soaps and fatty acids, but will not dissolve other fats and oils to any extent. It is an excellent solvent for most aniline dyes. Dyes which dissolve with difficulty in water may often be dissolved in alcohol, and the solution added to water.

Wood Alcohol, or Wood Naphtha

contains a high percentage of methyl alcohol mixed with other alcohols, esters, etc. The crude spirit is much used as a solvent for gums, but is unhealthy to use. It is sometimes called wood spirit.

Methylated Spirit.

The regular grade sold as methylated spirit consists of 90 parts of "pure" spirit, 10 parts of wood alcohol, and ⅜ to ½ part of petroleum oil, or so-called mineral naphtha. It is the latter ingredient which gives trouble to photographers. This grade is known by wholesalers as mineralised spirit. What is known as industrial spirit can be obtained (after obtaining a permit from the Excise authorities) which contains no mineral naphtha. It consists of 95 parts of "pure" spirit mixed with 5 parts of wood alcohol. A third grade, which can be obtained without a special permit, is called methylated finish, and consists of industrial spirit, to which has been added 3 ozs. of resin, lac, or sandarac per gallon of spirit. This kind may be identified by the fact that on the addition of water a white precipitate is formed.

The term "64 over proof" means that 64 parts of water must be added to 100 parts of the spirit in order to bring it down to proof strength; 64 over proof spirit contains about 10 per cent. of water; 61 over proof spirit contains about 11½ per cent. of water.

Amyl Alcohol, or Fusel Oil,

is a heavy alcohol, which evaporates slowly. It is a constituent of some of the dead black varnishes used by camera makers, and also of some celluloid varnishes. The penetrating odour possessed by some new cameras is due to the fusel oil not having entirely evaporated from the interior varnish.

Csmphorated Alcohol

is a mixture of 10 parts of methylated spirit to 1 part of camphor. It is the principal solvent used in the celluloid industry. It is a solvent of celluloid. If, however, ordinary celluloid is dissolved in it, a milky solution is formed, owing to the excess of camphor. A celluloid varnish can be made by dissolving pyroxylin in camphorated alcohol, allowing 2 parts of pyroxylin to each part of camphor.

Amyl Acetate,

or pear oil, as it is sometimes called owing to its odour of over-ripe pears, has a high boiling point, and is not very inflammable. It is principally used in the manufacture of celluloid varnishes, it being possible to add resins to the varnish when amyl acetate is used.

Acetone

has a very low boiling point. It is a very good solvent for resins. It is also useful for removing paint stains, as it will dissolve dried paint.

Halle's Solvent.

This is, perhaps, the best all-round solvent for celluloid. It consists of 2 parts of amyl acetate, 2 parts of acetone, and 1 part of benzole or solvent naphtha. It dissolves celluloid rapidly, and gives a tough film when the solution is used as a varnish.

Nitro-Benzol or Ess. Myrbane

is another celluloid solvent. It yields tough films. It is sold commercially as a substitute for essence of almonds in cookery; but it is poisonous, and its sale should be prohibited for this purpose. The fumes also have a paralysing action upon the brain, the effects of which generally do not appear until twelve to twenty-four hours after the poison has been inhaled. Deaths have occurred as a result of indiscreet use of this solvent.

Essential Oils.

Oil of lavender is a favourite constituent of retouching mediums. The object of adding it is to clarify the solution of the gums used. Oil of spike is a foreign grade of lavender oil which is not identical with the English variety. Spike oil replaces English lavender oil in most instances, but when bought in small quantities is often of poor quality. The amount of lavender oil necessary in a retouching medium is so extremely small that it is hardly worth while to attempt to economise by using a cheap oil. Other essential oils are sometimes used in place of lavender oil in retouching mediums, to which the same remarks apply.

Oil of wintergreen is frequently used as a preservative o' mounting pastes. A synthetic variety is called methyl salicylate. This is cheaper and quite as efficient.

Oil of cloves is not much used now as a preservative. It is a solvent of aniline dyes, and finds a use in the typewriter industry.

Non-Inflammable Solvents.

Although these solvents are supposed to be safe things to use, the use of them in more than very small quantities cannot be too strongly deprecated. The fumes of most of them have a powerful action on the digestive organs when inhaled, and a number of deaths have occurred as a result of too free use of these liquids. They are used principally in the manufacture of varnishes for articles which may be more or less damp, such as wood work and fabrics. They all contain chlorine.

Tetrachlorethane is used as a solvent in celluloid and cellulose varnishes. It has a slight smell of burnt wood, which hangs about for a long time after the solvent has been used. Other solvents are pentachlorethane, dichlorethylene, trichlorethylene, and pentachlorethylene. Some of these solvents have an unbearably sickly smell.

Carbon Tetrachloride is gradually decomposed in the presence of water. It is unhealthy to use.

The anæsthetic properties of chloroform are well known. Impure chloroform produces bad after effects when inhaled. Chloroform slowly decomposes in the presence of air, and especially under the influence of light.

No doubt, in the course of a year or two, a harmless non-inflammable solvent will be commercially obtainable.

Using Inflammable Solvents.

When it is necessary to heat inflammable solvents in order to dissolve certain ingredients, the use of an electric hot-plate is strongly recommended as a safe means of applying the heat. When electricity is not available, the best way is to use a gas ring or other stove, on which a basin half filled with sand has been placed. The vessel containing the solvent may be stood in the sand, so that any leakage is absorbed. In the event of a blaze, water thrown on the sand will extinguish the flames. In most cases a wet cloth will put out a fire at the mouth of the vessel. A lid should be placed on the vessel in order to minimise evaporation. A hole may be punched in the lid to take a thermometer.

The following table gives the principal physical features of the solvents named in this article. Most of the specific gravities given are from samples tested by the writer. Samples vary to some extent, according to the source of supply. The figures given in reference books are often inaccurate. The boiling points named are those at which the liquids commence to boil, as this is the information which is needed by any one wishing to make solutions.

Name of Solvent.	Speed of Drying.	Boiling Point C.	Specific Gravity.
		Deg.	
Turpentine	medium	160	·865
Rectified Turpentine	fairly rapid	"	"
Fat Turpentine	very slow	—	—
Shale Naphtha	irregular	irreg.	irreg.
Solvent Naphtha	medium	120	·868
Benzol, commercial	rapid	80	·886
Benzole, pure	rapid	80	·900
Toluol	fairly rapid	110	—
Xylol	medium	137	—
Cumol	medium	148	—
Nitro benzol	fairly slow	—	—
Petroleum ether, light	very rapid	40	—
" " medium	rapid	60	—
" " heavy	fairly rapid	80	—
Turpentine Substitute	medium	120	·770
Benzoline	fairly rapid	varies	varies
Ether	very rapid	35	·720
Alcohol, absolute	rapid	78	·794
" 90 per cent.	rapid	"	·821
" methylated 64 O.P.	rapid	irreg.	·821
Amyl Alcohol	slow	131	—
Amyl Acetate	slow	148	—
Acetone	rapid	56	·810
Carbon Tetrachloride	rapid	77	1·56
Tetrachlorethane	fairly slow	147	1·60
Pentachlorethane	slow	159	1·70
Dichlorethylene	rapid	55	1·25
Trichlorethylene	fairly rapid	58	1·47
Perchlorethylene	medium	121	1·62

JAMES GRAHAM.

DEATH OF MR. GEORGE DAVIS.—Amongst the numerous victims of the influenza is Mr. Geo. Davis, the well-known picture dealer, print-seller, and photographer, of Turl Street, Oxford, who died last week at the age of forty-eight. Mr. Davis was an enthusiastic member of the 1st V.B. Oxford and Bucks L.I., specialising in the Machine Gun Section, and held the rank of sergeant. In July, August, and September he served on the East Coast with the Special Service Company. He was a promising member of the Oxford Reform Club, was on the committee of the Clarendon Club, and Worshipful Master of the Alfred Lodge of Freemasons.

AERO-PHOTOGRAPHY.

[It has been reserved almost for the suspension of hostilities for anything approaching an adequate account of photography's part in the war to obtain publication. The following article from our contemporary, "Flying," was, however, published on November 5 last, since when (on Saturday last) Lord Weir has made public some figures indicating the enormous work of photographic reconnaissance which has been carried out. He said that in six months of 1918 the Air force units working with the Armies in France alone took a quarter of a million photographs, each of which yielded about 30 prints. These consisted of vertical photographs for the artillery and oblique photographs for the infantry. The work involved photography of practically every acre of ground in 6,000 square miles of territory. Reconnaissance and general observation, which covered general scouting and observation work of all enemy movements up to 50 miles behind the line, had been developed by means of the use of photographs taken at night with the aid of flares, and in this way the movements of troops by night were discovered. Truly the apotheosis of flashlight photography.—EDS. "B. J."]

Is the camera a more deadly weapon than the machine-gun? The question is neither so startling as at first sight it would appear, nor is it an attempt to enter upon any paradoxical controversy, but merely a carefully studied comparison of values. Let us first consider the military motive for clearing the air. Is it nothing more than preparing it for the use of our own planes; for reconnaissance, direction of artillery fire, contact patrol, bombing raids, tactical and strategical, and photography—particularly the latter? Were it only for the purposes of aerial combat, that glorious effort, that splendid *personnel*, would be wasted most sinfully. It is but a means to an end. Now, thanks to Messrs. Kodak, all the world is a picture—of pretty girls idling against riverside backgrounds, and historic ivy-creepered churches and castles. It comes hard, then, to imagine this same harmless toy a lethal weapon of war; responsible for the silencing of great guns; the annihilation of men and machines; the guide to the swarming attack over the noisomeness of "No-Man's Land"; the prelude to some gigantic bombardment of a slumbering city.

Some little time ago there appeared in the British Press official Admiralty photographs of the aerial bombardment of Bruges and Zeebrugge; smudged, scarred reproductions; pocked with dull, jagged markings, where British bombs had found their mark. Nothing more inspiring to public opinion could be imagined than this undeniable witness of the activities of our airmen. But the original negatives were not shown; that spade work of the photographers working, possibly days, weeks, or months, before the raid; supplying M.I. and the bombing pilots with the accurate, detailed survey of the district on which they were to operate. A comparison between those two sets of pictures would have clinched the argument outright. As it is, we must pass on to further facts; to the photographic negative that revealed the position of the big German howitzer that bombed Dunkirk so disastrously in the early days of the war. For some weeks our Intelligence people had been waiting for that information. You may be certain they wasted no time. Within three days that gun had been silenced for the duration—and some more. Artillery or infantry, retreat or advance, neither can be hidden from that prying eye of the heavens, that never mistakes, never forgets, never lies.

Fog and the Camera.

There is an instance on record of a German advance under cover of a heavy early-morning mist. The wily Hun had banked on this to get his reserves up unnoticed. And all would have gone well had not the daring pilot of a British photographic machine intervened. Though the Huns had cleverly attempted to camouflage their men in special phosphorescent uniforms, light filtration of the camera negative is proof against all such arts. In fact, it was the camera that furnished the first practicable basis to camouflage—the lesson that the shadow is an all-important thing; that the object you wish to conceal must not cast a shadow.

A striking instance of this was the case of a French town long held by the enemy. Allied artillery had, months before, rendered it untenable by constant bombardment. Hardly a building was left standing intact, when, one day, it was discovered that one of the battered houses had suddenly sprung a roof. About the same time a certain roadway behind our lines came under the daily, almost hourly, attention of an unlocated German gun. Heads were put together, and by a brilliant bit of deduction it was discovered that the new roof concealed this same troublesome new visitor. Naturally, this particular "stunt" was not carried out without considerable risk.

The aerophotography pilot's job, however, is always somewhat of the "do or die" order. It is a point of honour that the flight gets its "snaps," even if every available machine is sacrificed in the attempt. And then, undoubtedly, some other "photo" flight would carry on. If one man goes out and does not in due course return, another immediately follows him; if he is lost, there follows a third, and so on, *ad infinitum*. Perhaps the last man may pass over the wreck of one of his companions' machines, a tragic little spot of grey, far below. I have seen photographs of the first man's wrecked plane taken by the last pilot as he passed over it. You see, it is not a pleasant occupation by any means. And sometimes, often single-handed, the photographer is forced to fight his way home against overwhelming numbers.

"Snapping" and Fighting.

So it was, one summer's morning, when a photography-bound pilot went out with an escort of five fighting scouts to snap a certain area far behind the Boche lines. Barely had the observer set to work, and was already crouched in his shallow cockpit, when "Whouf, whouf," barked a machine-gun somewhere near at hand. He glanced up hurriedly to find half a score of Huns bearing down upon them. For a brief moment he hesitated. Then the British scouts came into action, and in-between-whiles the observer snapped his picture. He had come to the last but one on his film when the machine began to rock violently from side to side. It was a signal that did not take him moments to understand. They were attacked. He sprang to his machine-gun, and after a desperate, if shortlived, fight the enemy was driven off. The observer then calmly took his two remaining pictures, and they turned for home. If it is one maxim that "the aeroplane is the eye of the Army," it is another that "the photography 'plane is the eye of that eye."

It came about in rather a curious manner. Some time in the early days of the war the French and the British were co-operating together in a local advance. Certain dangerous obstacles were anticipated in the ground to be covered, and the problem was: How were these obstacles to be located? Our commanders were still debating on this point, and the hour previous to the attack had arrived when the French came upon the scene with an aerial photograph of this very area. Such a thing was regarded, if not as a freak, at least as a curiosity in those days, and particularly the queer black blobs on the negative that were supposed to denote barbed-wire entanglements. The British were dubious, but in due course the attack went forward, and in due course the accuracy of the photography markings was ascertained. We considered the matter. It was a small seed that was to blossom into a rich harvest.

Early Effort.

Previously, however—in fact, before the war—attempts that had been made with hand-cameras strapped to the base of the fuselage proved dismal failures. However, a small, thoroughly efficient section of the R.E.'s attached to the original Expeditionary Force achieved some measure of success with ground photography. The work was often difficult and dangerous, necessitating unpleasant trips up into the firing-line, and even out into "No-Man's Land." The operators often barely escaped with their lives, but they got their pictures; clearly marked panoramic views of the enemy trenches that ensured the saving of many valuable moments and yet more valuable lives in the ensuing infantry attack. At last their work began to be recognised by the people higher up. Then occurred the matter of the French aerophotograph. And early in

1915 the central School of Aerial Photography was established, attached to the R.F.C.

Starting in the humblest fashion, the wholehearted effort of two men housed in two large disused plain packing cases, the school now numbers hundreds, and has developed into an up-to-date scientific institution in England, equipped with every modern device and latest appliance. In the model dark rooms every candidate for acceptance as a R.A.F. photographer must first pass a severe practical test, designed to reveal his suitability, or otherwise, for the work. He is then given a month's practical intensive training, particular attention being paid to the processes of development and to the enlargement of negatives by artificial light. Much importance is attached to the rapidity with which these enlargements can be produced, for the fate of a battle may depend upon the promptness with which large-scale copies of a vital subject can be supplied to the Intelligence Staff.

The student is also carefully trained in the principles of colour photography, lantern-slide making the production of stereoscopic and mosaic photographs, the rapid drying and finishing of prints, map-reading, and plotting, and a host of other subjects indispensable to the practice of aerial photography at the front.

After a short further course at a training centre in England the airman photographer proceeds to a Service Squadron overseas, where he is assigned to a photographic section working with a reconnaissance flight. Such a "section" usually consists of a technical non-commissioned officer and about seven men, who take in turns the more confined and laborious aspects of the work.

But this is only the alphabet work of aerophotography. There are, in addition, to be considered special cameras, special lenses, special plates, special laboratories, and special methods. The R.A.F. camera itself is a solidly constructed instrument, quite unlike its popular counterpart, and, so far as the more modern types are concerned, resembling a gun rather than an optical apparatus. The lens is heavily shielded in a deep tube, to prevent direct sunlight falling upon it. At the other end of the "gun" is a steel chamber, containing the automatic devices for changing the plates after each exposure. The entire apparatus is securely fastened to the side of the machine, and is connected by a wire with the observer's seat. The pressure of a lever is sufficient to expose a plate and to bring a new plate into position. And that does not complete our survey. There are authorities on lenses, magnification, telephotography, and light fabrication. And there are mobile dark rooms on motor lorries, run by special technical experts, attached to each aerodrome. Aerophotography has become a fine art, of which fact there can remain no doubt when one considers this case of Captain X.

How it is Done.

Day after day, for over a fortnight and the same sector of the German "back-areas." Captain X—— carried out a detailed photography of a certain wide area from whence the staff anticipated an enemy drive. Under constant anti-aircraft bombardment, and, at his own request, working single-handed, he mapped every yard of the country to an area of many square miles, and was primarily responsible for turning what might have been an inglorious reverse into the capture of valuable Boche positions and a British advance of over a mile. Meanwhile, as X—— was at work in the air, his men were busy developing and printing the negatives, and turning them over to the Intelligence Service. Thus commenced a brilliant series of deductions.

And "reading" the aerial photograph possesses a real flavour of the exploits of Sherlock Holmes. Minute, almost imperceptible details overlooked by the amateur convey to the trained eye a wealth of meaning. Spots, scratches, blurs, blobs, scientifically handled, reveal the most unexpected details. That scratch may be a pathway leading to a new and unlocated enemy gun-position; this blur the gun itself; the blobs, perhaps, a large rest-camp or an ammunition "park." Turning the pictures over, one sees first the beginning, then the progress of the work, then its completion, then the putting on of camouflage. In one photograph half the camouflage is on. In the next it is all in place, and the position of the work is indicated only by what looks like a faint blur. The next photograph shows directly over the completed work a white spot like a ragged ball of cotton or the mark of a blemish on the negative—where the British bomb has found a target. The camera "observer" never makes a mistake.

Permanence and Impartiality.

Instead of the quick unfocussed impression gathered by the human observer while flying, perhaps under fire, the camera makes a permanent record, which may be studied at leisure in a place of safety. Instead of seeing one thing as the eye does, and then jumping to another thing, the camera's eye takes in impartially every detail that comes within its range of vision. As a comparison of respective reliabilities, the following incident serves to indicate on which side the balance lies.

An observer returning from a flight back of the German lines at a time when gas was being used reported four gas tanks at a certain place. A photograph a few minutes later, however, revealed the supposed gas tanks as harmless logs of wood. That is where the camera scores.

It is accurate to the nth degree, so accurate, in fact, that aerophotography has almost entirely replaced the older art of map-making. Contours are not shown, but what is more essential, where the map is often five or ten years old, the plate is up to date to the moment; where the one reveals only roads, railways, rivers, towns and villages, the other supplies the additional—and most valuable—information, the precise locality of every enemy position, gun, and concentration in that area. Square by square, mile by mile, negative by negative, the work of the aerophotographer is pieced together by the staff in one huge plan; until to-day the British are in possession of a reliable chart of every German position, from Arras to the sea. But to finally illustrate our point, and to answer our opening query, there is one more anecdote to be given—one of the finest of the war.

A Persistent Expert.

A British major, a pre-war scientific expert in matters photographic, went out one day to get some special photographs of a vital point in the German "back-areas." He had been specially chosen for the job by reason of his previous qualifications, because of the intense value these particular negatives would serve. But misfortune dogged his footsteps all the time. The machine he started on, immediately after crossing the lines, was caught by an "archie" burst that smashed his camera to smithereens and wounded him in the left arm. A second venture proved no more successful. The machine developed engine trouble almost immediately he took the air. But, still undaunted, he flew off on a third, snapped his photographs, and was set upon by a couple of Hun scouts. By a cool piece of daring he drove off his assailants. But before he was able to clear himself he had again been wounded, and again in the left arm. He suffered agonies of pain. Most men under such conditions would have landed at the first available spot within our lines. But not so with the Major. Realising the value and urgency of those negatives in the camera by his side, weak and faint from the loss of blood, he kept right on to his own aerodrome, and made a perfect landing. Then he handed in his photos and fainted dead away.

Summed up detail by detail, incident by incident, the judgment can be no other than the case for the aerophotographer against the aerial machine-gunner as a destructive factor of warfare. A bullet may kill a man, perhaps two; a round from a machine-gun bring down an enemy 'plane. But the influences of the aerophotograph are wider, more deadly. The art of the aerophotographer does not end here. In war the British have snapped a country; in peace, the picture of the world will be theirs in negative form. The gun is abandoned, but the camera goes on.

FORTHCOMING EXHIBITIONS.

October 14 to November 30.—Royal Photographic Society. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

Photomicrographic Society.—The next ordinary meeting of the Photomicrographic Society will be held on Wednesday, November 27, at 7 p.m., at King's College Bacteriological Laboratories, 62, Chandos Street, Charing Cross, W.C., when J. E. Barnard, F.R.M.S. (president of the Royal Microscopical Society), will give a lecture, entitled "Microscopes." Visitors will be heartily welcomed, and cards of invitation may be obtained on application to the Hon. Sec., Mr. J. G. Bradbury, 1, Hogarth Hill, Finchley Road, Hendon, N.W.4.

DEATH OF MR. A. L. ADAMS.

The death of Mr. A. L. Adams, briefly announced in a paragraph last week, removes from the ranks of the photographic trade one of its most prominent members. Mr. Adams had been in business as a maker of, and dealer in, photographic apparatus for very nearly thirty years, and during that time had attained distinction as a pioneer in the design of many particular descriptions of photographic camera and other apparatus. The reflex camera especially is an instrument the development of which to a point of extreme perfection is very largely due to the successive inventions of Mr. Adams, who also devoted much attention to the production of cameras of extreme portability as represented in the Vesta series of instruments, Idento, and other models. In the early days of the hand-camera Mr. Adams was also a pioneer in the design of a brilliant finder free from the general defects of this type of indicating accessory. In fact, a long list might be made of patterns of camera and accessory apparatus which owed their introduction to Mr. Adams's genius in invention. On the mechanical side of photographic manufacture his death, at the comparatively early age of fifty-six, creates a gap which cannot be readily filled. We are informed that both the manufacturing and sales branches of the business will be continued precisely as hitherto, and that the firm's various and many patented specialties will continue to be obtainable in measure corresponding with the present national conditions.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

The Ferricyanide Reducer.

The above is one of the most useful chemical accessories that the photographer has. At the same time, while it is such a good servant, it is apt to become a dangerous master if its nature and its limitations are not clearly understood. By far the handiest and safest method of employing this reducer is not that in most general use, but now that the price of chemicals does not allow of wasteful habits, it may be as well to say that the best method in theory and in practice is also the most economical.

As regards the potassium ferricyanide, the strength to make the stock solution is immaterial, as in working one judges by the depth of colour. An ounce in a pint of water is quite a useful strength to make, and is easy to remember.

The hypo solution should not be merely a little out of the fixing-bath. It is almost as bad to put a few crystals of hypo and of ferricyanide in some water and let them dissolve together, as many workers do. The proper way is to keep a special big bottle of hypo of a known strength, not less than four ounces to the pint. This should be kept filled up so that there is always hypo solution of normal temperature. Fresh-made hypo solution is usually cold, and calls for more ferricyanide than one would otherwise use. This results in uneven action over the plate, and a sudden jump when the stuff has begun to work, so that it is difficult to control.

The way to work to the best advantage is to take just enough of the hypo solution for the job in hand and not pour out a lot because it happens to be cheap. Then add just enough of the ferricyanide solution to turn it a lemon-yellow—that is, the depth of the rind of a lemon. Remember that it begins to go bad directly the two ingredients are mixed: so it is best to keep them apart till one is quite ready to use the reducer. For the same object, i.e., proper action of the chemicals, it is advisable to rinse the plates or prints, as the case may be, after fixing, so as to get rid of anything likely to contaminate the ferricyanide. Some people like to put plates, etc., back in the fixing-bath after reducing, and there is no harm in doing so, but also there is no need if a proper strength of hypo solution is used for the reducer. Another very necessary point to observe is to get the two solutions very thoroughly mixed before use. There is scarcely another process that will show up so unmistakably the unevenness caused by want of thorough mixing.

There are other unevennesses that this reducer will show up badly that are not the fault of anyone, but are inherent in photographic practice. It is advisable to have a knowledge of these, therefore, so that the danger of spoiling a passable plate in trying to improve it may be avoided. The action of the reducer is that it eats away the fainter parts of the image more rapidly in proportion than the denser, thus increasing contrast, not only between details, but also between various areas. Now many negatives that have been fully exposed and developed look pretty even in density all over, and will give an even print or enlargement, although actually they may be uneven either by reason of varying thickness of the emulsion, always present to some extent, or by the illumination of the lens being stronger in the centre than at the edges. Most lenses show this, the worst being wide-angle lenses, and the very large-aperture variety do the same, while the most even negatives are from lenses of moderate or long focal length at the more central portion of their field. Anyhow, these defects are not noticed in normal cases because the difference in the densities due to the faults are small in comparison to the ordinary differences due to the subject. Directly one begins to reduce, however, owing to the "selective" action described, these variations begin to show up badly, and are always made much worse than they need be if the reducer is too strong in ferricyanide, or if it is used in some other of the faulty ways described.

Properly used, with judgment, the reducer will improve many a faulty negative or print, either by local application with cotton-wool or all over by immersion. It will correct vignettes in bromide prints just as well as the iodine-cyanide; but it is not to be expected that it will reduce a black image to a light one without leaving a trace of colour; nor that it will let a negative of great opacity down to normal density with as good a result as if the plate had been correctly exposed and developed in the first place.

D. Charles.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Lettering in Cinematograph Films.—No. 119,556 (Oct. 17, 1917). The invention relates to the incorporation of wording into cinematography picture films, and consists in the production of a negative film bearing only the words or sentences, which word-negative is then combined with the scene-negative, and the positive film printed therefrom.

A glass or other transparent body is used upon which are printed, written, or otherwise indicated, the words to be photographed, or the letters may be separate from the glass and secured thereto, said letters being arranged in such a position and of such colour as will render them not only distinct from the background of the scene, but also that they will be placed in the desired position upon the picture.

In order to secure the proper positioning of the words, a white screen, of about the same average size and proportions as that upon which the pictures are to be projected, is ruled horizontally and vertically, so that it is divided into a number of squares. The squares horizontally are distinguished by letters and vertically by numerals.

The scene film image is then projected upon this ruled screen measure, and the position of the reading matter and the space it is to occupy is now noted by means of the positions of the horizontal and vertical lines represented by the letters and numerals, as also the number of consecutive negatives upon which is to appear any one word or groups of words.

In the drawings, fig. 1 shows a portion of a scene negative film having a figure thereon with which it is desired to associate the words. Fig. 2 is a view to an enlarged scale showing the scene negative with a ruled screen applied thereto in order to ascertain the position of the words; fig. 3 is a view of a duplicating measure screen regulating and showing the correct position of the word before it is photographed upon the word-film; fig. 4 is a view showing the word-negative alone as it has been photographed after removal of the duplicating measure screen; and fig. 5 is a view of a positive produced by the combination of the scene and word-negatives.

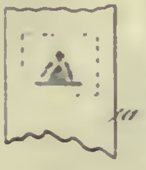

Fig. 1.

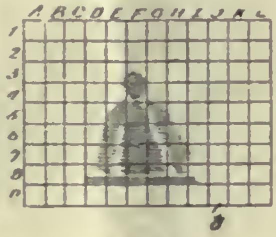

Fig. 2

In these figures *a* indicates the scene-negative film bearing the figure and which negative is produced by photographing the figure scenes in the usual manner. *b* indicates a ruled screen with the scene-negative either projected on to it or seen through it as shown in fig. 2. For convenience of illustration the screen is shown to a larger scale than the actual size of the picture on the negative. The horizontal and vertical lines on the screen are in the present instance respectively identified by the figures 1 to 9 and A to L. Either the ruled glass measure is applied to the scene-negative, or the scene-negative is projected on to the larger white screen measure and a suitable position for the word or words is determined and noted by the aid of the aforesaid ruled lines. A duplicating measure screen *b*' is now applied to regulate the position of the words which are to be photographed against a suitable background, and by this means a position is located against this background corresponding to that selected upon the figure-negative.

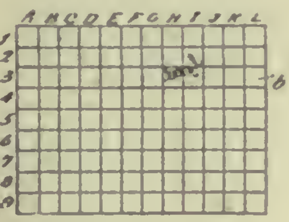

Fig. 3

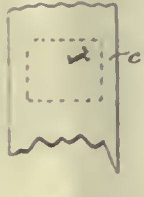

Fig. 4

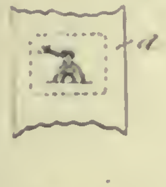

Fig. 5

To whatever extent it is deemed necessary the position of the word matter is changed between exposures to give it the effect of movement in the resulting picture. The screen *b*' is removed between each exposure and the word or group of words *c* is photographed by the aid of a cinematograph camera to produce the word-film, the number of photographs taken coinciding with the length of time calculated to be occupied by the character in speaking the word. In the case of a continuous monologue or dialogue the same process is repeated for each succeeding word or group of words by photographing them one after another upon a continuation of the same or a similar length of film. The words may be so photographed that they appear to be attached to the speaker or speakers as the case may be by the same process as that already described, and they can thus be shown as representing words spoken by any number of different characters who may appear in the scene.

After the production of the figure and word-negatives the two are superposed and cinematically reproduced on a single film as a positive *d* as shown in fig. 5. Lyddell Sawyer, 19, Sloane Street, London, S.W.1.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, November 25.

South London Photographic Society. "The Story of Our Old Churches." H. H. Wrench.
Bradford Photographic Society. Demonstration: "Elementary Bromide Printing." For beginners. N. Duckworth.
Dewsbury Photographic Society. "More About Lantern Slides." H. Potter.
The City of London and Cripplegate Photographic Society. "A Chat on Pictorial Photography." S. Brigden.

Tuesday, November 26.

Royal Photographic Society. "The Gum-Bichromate Process with a New Colloid." H. S. Starnes.
Manchester Amateur Photographic Society. "High-Speed Photography." R. Clough.

Wednesday, November 27.

Croydon Camera Club. "In the Alps with a Camera." Dr. C. Atkin Swan, F.R.P.S.
Ilford Photographic Society. "Lantern Slide Making." R. U. Knott.
Leicester and Leicestershire Photographic Society. "Development by Six Members."
Dennistoun Amateur Photographic Association. Visit to Partick C.C.

Thursday, November 28.

Brighouse Photographic Society. Y. P. U. Slides and Prints. Selection Night.
Hammersmith Hampshire House Photographic Society. "Spring Under Italian Skies." J. D. Johnston.
Rodley and District Photographic Society. "Clouds in Pictures." Messrs. Willey and Slater.
The Camera Club. "London in Song." Mrs. Leedham Crowe.
Hull Photographic Society. "Lantern Slide Making." Messrs. L. Kirk, J. W. Atkinson, J. T. Dyson.
Liverpool Amateur Photographic Association. "Rhyme and Revolution in Germany." J. G. Legge.

Friday, November 29.

Dennistoun Amateur Photographic Association. "Development." R. Wallace.

THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A Meeting of the Council was held on Friday, November 18. Present, Messrs. Marcus Adams, F. Brown, Gordon Chase, Alfred Ellis, S. H. Fry, W. E. Gray, G. Hana, R. Haines, A. Mackie, Lang Sims, R. N. Speaight and H. C. Spink.

The hon. secretary said he had not had any communication in reference to the meeting the delegates of the P.P.A. had with certain plate manufacturers, but he understood that there had been a difficulty in getting the plate makers together, but the draft of a communication to the Association was being circulated among them for approval.

In reference to the case brought forward at the last meeting of the Council of alleged malpractice on the part of the police authorities with regard to a member, the hon. secretary reported that the Council's solicitor had written to the member for particulars of the case with a view to the Association taking the matter up, but had received no reply.

Letters had been received from Mr. G. E. Mackrow, hon. secretary of the Sheffield and District Professional Photographers' Association, giving particulars of the newly formed Association, also referring to the recent order restricting lighting to 75 per cent. of that used last year. A letter on the same subject from a member was also read. The hon. secretary stated the nature of his replies.

Letter read from a member asking advice with regard to the liability of the manufacturers of a batch of bromide paper which had turned out to be faulty, and the hon. secretary was instructed to communicate the opinion of the Council thereon.

The publication of the November number of the P.P.A. Circular was reported, wherein was enclosed an application form for membership and a request to each recipient of the Circular to obtain a new member for the Association.

Letter read from a member stating that his studio had been damaged in an air raid and that on applying to the Insurance Company for compensation he was informed that the studio was not included in the insurance. On reading the policy he found it stated therein that the studio was expressly stated not to be included in the list. He had not until then read the policy. The Council thought he had a good claim under the Government free insurance arrangement.

Names of new members were read, six in all.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, November 19, Mr. A. H. Lisett in the chair.

Mr. J. Dudley Johnston delivered a lecture entitled "Personal practice in Lantern-Slide Making," and gave a most explicit and interesting recital of the methods adopted by himself in making the supremely beautiful lantern transparencies which accompany his travel lectures.

At the outset Mr. Johnston emphasised a point in the preparation of a set of lantern slides for a lecture which within our knowledge has not been previously the subject of recommendation. This is that that the lecturer should first of all plan not merely the order of the subjects which he will choose for his slides, but should select a predominant tone for the whole series—predominant in the sense that most of the slides will be of that tone. On the other hand to avoid monotony interspersed slides should be judiciously chosen of different tones suitable to their subjects, as well as creating the relief of contrast, without, however, introducing a too violent departure from the general scheme. Mr. Johnston illustrated this policy by showing a few slides of Italian landscapes made in a rich brown tone appropriate to the sunny character of the subjects. Following them he exhibited one or two examples of slides in grey and bluish grey as specimens of transparencies which could be interspersed with good effect. Such a scheme as this, he said, should include the assemblage of the strongest effects among the last few slides of a lecture, those more or less immediately proceeding them being selected so as to permit of a crescendo illustrative note, so to speak, being struck. In all this, as the lecturer was at pains to point out, the variations need not and should not be excessive. Mr. Johnston showed, by selections from his own studies of slides, the very great degree of variety which was possible while still employing tones (i.e. colours) in the transparencies which never could be called vivid.

Passing from this admirable advice on the artistic composition of a lantern lecture considered as a whole, Mr. Johnston proceeded to describe the practical methods he used in making his slides. He explained that they were uniformly made by reduction and by artificial light, the latter being the luxurious equipment of three mercury tubes the light from which was used after reflection from a white reflector. Using Paget slow lantern plates, the brand he invariably employed, exposures ran from 30 seconds to 15 minutes according to the degree of over-exposure given as a means of obtaining a warm tone. The developer he had usually employed for the customary method was Adurol in conjunction with ammonium bromide and ammonium carbonate, adding more of the former for reddish tones and more of the latter for purplish tones. He had found that a developer warmed to 70° to 75° was favourable to the production of the warm tones. Of the two makes of the pre-war Adurol, those of Schering and Hauff, he had found that Hauff's was superior, but he had no doubt that English chemists would provide something as good as or better than either, and that it would not be necessary to go back to German-made developers.

For the production of a wide range of tones, from a strong rich black to red, Mr. Johnston employed the metol-thiocarbamide developer introduced by Messrs. Wratten, and described in their first booklet on lantern-slide making, although withdrawn from subsequent editions. He confessed that it was a developer requiring a good deal of experience. The chief difficulty was gauging the density of the slide. It was necessary to abandon the plan of holding the slide up to the light: instead the slide was watched by reflected light as it lay in the dish and its colour changes carefully observed, in particular the apparent lightening of the darkest shadows to a buff colour after development had proceeded to a fairly full extent. At this stage development was very nearly complete.

Mr. Johnston gave it as his experience that there were very few slides which were not improved by judicious reduction. He used Farmer's reducer, applying it with the finger tip or with a sable brush. With experience and patience a great deal was achieved by local reduction. For intensification the acid silver intensifier, compounded from metol, acetic and citric acids and silver nitrate possessed the advantage that it did not alter the colour of the image whatever the colour might be. But it required to be applied to the dry-slide, and it could not be allowed to act for more than 1½ minutes. If it acted longer there was a blue-toning action. Therefore if sufficient density was not quickly secured it was necessary to wash the slide, dry it, and again apply the intensifier for the prescribed short time.

On the proposition of the chairman the very hearty thanks of the meeting were accorded to the lecturer for a most valuable contribution to his subject.

CROYDON CAMERA CLUB.

Mr. G. B. Clifton arrived last week in a state of smiling combativeness to give a lecture on "Control in Bromoil," which was illustrated by many striking examples of the "red rag to the bull" order, though very happy in all other respects. Prior to the attempted massacre of the innocents, the president, Mr. A. F. Catharine, referred to the armistice. He truly said that during the war their Wednesday evenings had provided brief and welcome intervals of forgetfulness. A short while ago little did they think that the Kaiser would go clattering down an abyss of his own making—a master criminal primarily responsible for all horrors inflicted by the Hun, and also for the advance in price of dry-plates, in half-plates to the ghastly tune of 8s. dozen. "The King" was then given, and responded to with great enthusiasm, as were toasts to the British and Dominion troops and all our Allies, with emphasis on the last and deciding factor from across the herring pond. Well done "dollars"! Next a silent toast to those fallen in the cause of freedom.

Mr. Clifton was then requested to expound, and as he rose, catching the eye of a purist whose face was wreathed in happiness at the prospect of an unrationed repast, he glared defiance, at the same time saying how glad he was to arrive on the wings of Peace, though he felt confident a terrible conflict would break out before he left the room. As events proved his confidence in the club was not misplaced. He then showed a series of transformation-scene Bromoils, and explained how the alterations, all executed on the prints, were effected. So involved were some procedures that one might well wonder whether the game was worth the candle, but as Mr. Clifton apparently enjoys it nothing more need be said on the point. All the Bromoils were of admirable quality, a representation of an emu in particular being much admired. It had the advantage over the original, as close scrutiny was possible without danger of being mistaken for a spittoon by the charming bird. He said he always envied the occupants of the Zoo because they lived so close to the bars.

Turning sadly aside from this dreadful pun, the lecturer's views may be briefly alluded to. In photographic pictorialism he claimed that practically everything is legitimate towards the desired end, and firmly declined to admit any limitations whatever. He deletes figures and other objects, and deliberately introduces them, often by hand drawing or painting. Heavy and complicated line work by hand is executed on the bromide print, followed by bleaching and pigmenting. Being challenged as to whether he would exhibit an example of the last process as a "photograph" at a photographic exhibition, he stoutly replied he would do so without the slightest compunction, for he was out to make a picture, and considered the means of relatively small importance. In his hands Bromoil was a combination of hand-drawing and pigmenting, and he based his argument on the methods of artists. In fact, those who opposed control were going against Culture with a capital "C." On the other hand, many try the process who should never attempt it.

It thus becomes evident that Mr. Clifton's views, whatever may be thought of them, possess the merit of being definite. Curiously, he pigments on bromide prints, which Mr. Harpur once characterised as "superlatively rotten," and on this occasion Mr. Sellors remarked that if he were to hang them on the walls at home, he would assuredly cut his throat, an observation which brought an earnest request from the office boy that a few should be lent the secretary for the benefit of the club.

It says much for the lecturer that the discussion following was as virile as his contentions. But in fairness to the club it must be stated he found none to agree with his extreme views. Even such an accomplished Bromoilist and advocate of control as Mr. J. Keane parted company with him more than half-way. Mr. E. F. Wadham agreed that Bromoilists should be artists, but generally found them murderers. The Rev. C. W. Le Warne (a skilful artist) feared to try the process lest he should be led into results he deplored. Too frequently Bromoil prints were muddy, clogged, and dirty, though Mr. Clifton's were delightful. He quite realised that Bromoil in the hands of an artist might bring out beauties which a straight print could not realise.

Mr. E. A. Salt opened fire from many standpoints. He was keenly interested in drawing, and in painting, and in pictorial photography, but not in a combination of the last with drawing and painting in unknown proportions. Artists, held up as models to follow, were generally very severe on medium mixers. Years ago an ingenious exhibitor photographed in diffused style a water-colour sketch, and secured a medal with it at a photographic exhibition, which the judges insisted on being returned when the truth leaked out. Rude persons stigmatised the affair as a fraud, but he, the speaker, could see no essential difference between this exhibit and one of Mr. Clifton's extreme productions. On the question of control, the good feeling of each worker must determine its extent. He flatly declared that photographic pictorialism was injured rather than advanced by departing as far as possible from photography. He spoke more in sorrow than in anger to one capable of first-class straight work. Mr. J. M. Sellors found himself somewhat in sympathy with the last speaker (a most unusual state of affairs), and ably championed the Bromoil process, which *per se* had never been attacked. Many others joined in the fray. A most hearty vote of thanks was accorded Mr. Clifton for an evening full of fight, fun, and frolic, one quite like good old cockpit times.

News and Notes.

French War Photographs.—Lord Reading on Tuesday last opened an exhibition of enlarged and coloured official French war photographs at the Goupil Galleries, 5, Regent Street, arranged by the Anglo-French Society in aid of the British Committee of the French Red Cross. Some two hundred pictures will be on view each day from 10.30 to 6.

Photographer Wanted.—William B. Logan, Private, 16th Canadian Scottish, No. 2 Company, 5th Platoon, France, was photographed in London during the first or second week of September 1916, paid for a few copies and desired them to be forwarded to the above address in France. He is now feared to be killed, and his relations are anxious to have the photographs. If any of our readers can discover that he is the photographer in question he is asked to write to Mrs. S. J. Webster, Suvla Bay, Cluny Crescent, Swanage

Lancashire Master Photographers' Association.—A general meeting of the Society will be held at the George Hotel, Preston, on Tuesday, November 26, 1918. Chair will be taken by the President, Mr. N. S. Kay, at 6.15 p.m. prompt. Most interesting agenda will be placed before the meeting, including:—1. Charges for electricity on power ratio. 2. Suggested certificate for members. 3. Question of wages for each branch of the business. 4. Proposed exhibition in Lancashire of members' work. 5. Question of apprentices. 6. Charges for re-sittings. 7. Latest position re Co-operative Plate Works. 8. Wounded soldiers and photography. Now that the war is over and the Government have laid it down as a principle that they can only deal with well organised trades, it is imperative that the photographic trade should not be left behind in its organisation efforts. Membership is about 120 and the Society is desirous of enrolling every photographer. The officers and committee trust that every photographer in the county will attend this meeting at Preston on November 26. Application forms for membership (the subscription to which is 10s. 6d.) can be had from the honorary secretary, Mr. F. Read, 14, Balfour Road, Southport. Owing to December being an exceptionally busy month, there will not be a further meeting until January.

Photographs of Soldiers' Graves.—The armistice has at last rendered it possible to make a thorough examination of the cemeteries in the middle area, and a thorough search for graves in and beyond the old front line of 1915. The Graves Registration Units (writes the "Times"), which for four years have marked and registered every grave that could be reached, have now been largely reinforced for the new work, and the trained officers who have carried out this duty under war conditions can now move more freely over the battlefields. Their immediate duty is to satisfy themselves as to the state of every grave over which advance and retreat have taken place, and to mark, register, and fence in every grave now located for the first time, in order that identity may be preserved in every possible case, and that every preparation may be made for permanent marking. About a thousand cemeteries and very many thousands of isolated graves have thus to be dealt with.

Arrangements have been made to inform the relatives of those who are buried in the middle area of the condition of any grave about which inquiry is made. There are complete records in the War Office, arranged by sections of maps, of every grave, whether marked and registered by the Graves Registration Units or reported to them but not yet found; and these records will be checked on the spot, section by section. It is hoped that those relatives whose inquiries relate to areas not yet searched will not lose patience, but remember that the work on the ground which is of special interest to them can only be carrried out in its turn.

The photographing of graves, on the application of relatives, will now, it is hoped, be carried out more quickly under the new and more favourable conditions; but here, again, it must be remembered that a cemetery may often require considerable repair and reconstruction before a single new photograph can be taken. This work of photography, as well as the planting of cemeteries, will be financed during the coming year, as those have been in the past, by the Joint War Committee of the British Red Cross Society and the Order of St. John of Jerusalem.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

MATTERS OF PROFESSIONAL MOMENT.

To the Editors.

Gentlemen,—The lusty growth of the Edinburgh and Lancashire Societies and the suggestive criticisms of your correspondence columns are happy auguries for future combination of photographers. This progressive fraternity, so necessary in view of peace reconstruction, must survive in spite of the ill manners of "Diogenes," a nom-de-plume under which I think I recognise the boorish style of one associated with the P.P.A. I cannot agree with Mr. Chapman that the admittance of assistants is one of the numerous reforms of which the P.P.A. stands in need. His main argument that entered as associates they will automatically swell the numerical strength as they become masters may be admitted, but the man who joins as an assistant would surely join in any case so soon as his status permitted. Personally I imagine that any additional men gained in this way would be more than counter-balanced by the retirement of those unwilling to countenance a society striving to please assistants and masters.

Human nature values only the exclusive—imagine the sergeant-major's remarks as he wends his way to the village inn so soon as he hears the sergeants' mess is thrown open to all and sundry.

The spirit of compromise is the real weakness of the P.P.A. Photography on factory lines and costing and photography based on high-art prices if not high-art principles are two opposite propositions, and the P.P.A. must not attempt to please both. It is as if the medical association tried to represent the Harley Street specialist and the manufacturer of patent medicines; add the interests of the doctor's chauffeur to the confliction and you have something analogous to the P.P.A., plus assistants.

There is certainly no reason why an assistant should become an associate in order to go on the rota of the employment bureau whilst the educational facilities should be available through P.P.A. members for their nominated assistants, or any assistants for that matter, since it is to our advantage that assistants become efficient.

Do not imagine that I consider employers' and employees' interests antagonistic—they are merely divergent. Things of vital interest to one are mere incidentals to the other; both are equally important and have equal rights, but any two things are better done separately than together. A strong assistants' union would be the best thing for the trade that ever transpired.

Photography's main trouble, soon to be accentuated, is the incompetent assistant, untrained by the incompetent master, who thinks low wages an unmixed blessing, forgetting that they either drive away the industrious and intelligent to better trades or render them careless and disinclined for self-improvement. This same employer is too busy to find the exceptional assistants; but had he to pay a reasonable minimum wage he would find time to see that it was earned.

Regarding the suggestion for county associations, as a Yorkshire photographer hoping for speedy demobilisation in order to glean amongst the stubble the home-defenders have left, I should be very glad to get together with Mr. Medcalf and other types.

The county of broad acres presents special difficulties in the way of transport. The West Riding, itself bigger than Lancashire, could doubtless form a healthy society from its closely packed industrial centres, but men like myself in the thinly populated North and East Ridings could only get to the populous centres at the expense of much time, trouble and discomfort. Apologising for the length of this letter and wishing you and my numerous photographic friends a Happy Peace.—Faithfully yours, W. Foster Brigham.

Scarborough and Bridlington.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent *International Coupon, from readers abroad.*

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

W. B.—We suppose you mean the iodine-cyanide reducer or clearer. If so, it should be used after prints have been washed from the fixing bath.

David Ireland.—Not manufactured in this country that we know of. They came from America. You might try what Messrs. Fallowfield can do for you.

G. R. H.—Permission will not be refused unless there is special reason for it. You should address an application to the Director of National Service, 84, Westbourne Terrace, Paddington, W., the regional headquarters for Surrey.

J. T.—There is such a wide range of prices for the work you mention that we feel that we cannot give you any useful information. If you are a member of the P.P.A., we would advise you to write to the Hon. Secretary on the question. If you are not a member by all means join; it is such matters that the Association are competent to deal with.

E. G.—We cannot find the Watson Standard portrait lens in any catalogue, but we find a No. 3 cabinet lens 3 in. in diameter and 10 in. focus listed at £6 10s. At the present time such a lens should fetch between £3 and £4. The Ross doublet is of little value, as it is a clumsy lens, considering the small aperture, it might be worth 20s. to 25s.

G. H.—You can use the half-watt lamps in exactly the same way as you have been using the arcs. We have used the lamps in the metal reflectors sold by the General Electric Company, turning the light full on to a white screen with excellent results. About six 1,000 c.p. lamps should give you all the light you require. Of course, you will not need any diffusers *between* the half-watt lamps and the white wall.

Starting a Business.—I would like to ask if I am required to take out a licence to open a studio as well as to register my premises.—Australia.

The order of the Ministry of National Service restricting new retail businesses is still is force. You require to apply to the branch of the Ministry located at 82, Westbourne Terrace, Paddington, W. Registration of a business is necessary only when you trade under a name other than your own. If you are going to do so apply to the local post-office for the necessary form or write to the Registrar of Business Names, Russell Square, London, W.C.

W. D.—We think that you will find a second row of roller blinds troublesome and expensive. For the purpose you mention the best plan we have seen is to have one rod run along the ridge of the roof and another at the eaves. Black curtains in one length are run on rings on the top rod and dropped over the lower one right down to the bottom of the side light; when not required the curtains are run up to each end and the ordinary blinds can be used. This is perfectly satisfactory even with the strongest form of artificial light.

E. R.—About the most commonly adopted plan for cheap production of 20 x 16 enlargements is to fit up a single arc lamp, so that it serves the double purpose of providing light for the enlarging lantern and also for the copying camera. A very large firm in this trade, whose works we inspected some time ago, had the lamp arranged, so that it provided the light-source for an enlarger placed within the dark-room (which was partitioned off from the general room), whilst it also illuminated the original on the copying easel. There is nothing particularly special about the enlarger or copying apparatus apart from their being of a type which is capable of rapid operation. If the whole of your work is from copy negatives, and your arrangements allow of it, we should think a very convenient plan for the enlarger would be to have it built vertically and of fixed focus, so that you had simply to insert the negative and lay the paper on the easel below it. But this, of course, would make the enlarger a quite independent apparatus from the copying board.

The British Journal of Photography.

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SUMMARY.

Although X-ray photography is generally associated with medical and surgical subjects, other fields of usefulness are constantly being opened; its applicability to metallurgy and engineering is the subject of an article on page 535.

An article on page 534 deals with the practice of negative development, pointing out several common errors and outlining a method of securing conformity of quality and density.

We regret to record the deaths of two well-known photographers during the past few days, Mr. H. J. Pearce, one of the best known Press photographers, and Mr. Walter Pouncy, of Dorchester. (Page 541.)

An account of an important modification of the gum-bichromate process, described at the meeting of the Royal Photographic Society, is given on page 540.

Some advice to young photographers who wish to take up engineering photography, either on the staff of the works or as an occasional job, is given on page 538.

A recent paragraph in our columns on flashlight portraits has elicited a letter from an American manufacturer, which appears on page 542.

Specifications of an improved shutter for cinematograph projectors, the disc being formed of glass with corrugated sectors, appear under Patent News on page 539.

The advantages of using a very small camera, fitted with a large-aperture lens, as an auxiliary to a larger instrument for such work as flashlight and Press photography, are pointed out on page 534.

The use of artificial illuminants for enlarging and reducing by transmitted light, and also for direct camera work, with a short summary of the principles involved, is dealt with in an article reprinted from "American Photography." (Page 536.)

A sketch of the early career and exploits of M. Felix Nadar, the first aerial photographer, appears on page 543.

The British Scientific Instrument Association, of which Mr. H. A. Colefax, K.C., has just been elected chairman, has found a home at 26, Russell Square, London, W.C. (Page 541.)

An interesting exhibition of French war photography is now open at the Goupil Galleries, a special feature being made of the material damage done by the enemy. (Page 541.)

The question of establishing an Assistants' Section of the P.P.A. is discussed in two letters on page 542.

Some notes on the arrangement of lantern lectures, with special reference to Mr. Dudley Johnston's recent lecture, and to conveniences for note-taking, will be found on page 533.

Combination photography, fog in the studio, waterproofing dishes, and the focus of the studio lens are among the subjects dealt with in "Answers to Correspondents." (Page 543.)

EX CATHEDRA.

Planning Lecture Slides. Lantern lecturers ought to be grateful to Mr. Dudley Johnston for his disclosure of the secret of his success as a lantern lecturer so far as the presentation of the pictures is concerned. We do not recollect that anyone before him has seriously considered the planning of a lecture set of slides as a whole in the aim of presenting projected pictures in a series of harmonising tones and keys, broken, at discretion, by individual slides or small series of them designed to lend relief to the entire presentation. Probably it has hitherto been true of ninety-nine lantern lecturers out of a hundred that they gathered together the best slides they could get hold of of the subjects required and assembled them in order of the subject matter of the lecture, regardless of the effect which, in a 12 ft. or 20 ft. projection, they would have upon the audience. Mr. Johnston points out a more artistic way, yet one, however, which makes very great demands upon the skill of the slide maker. Comparatively few makers of lantern slides could produce lantern transparencies of the superb quality and, at the same time, pleasing variety of tones which Mr. Johnston showed last week at the R.P.S. But no doubt the plan is one which is bound to be adopted by lantern lecturers who wish to keep in the front rank. We may suggest a further measure of relief to the audience, namely, the making of a five or ten minutes' break half-way through a lecture with the lights turned up. This is a common French practice, and a very good one where the number of slides to be shown at one sitting is anything above a hundred. Moreover, it is a relief to the lecturer, and, let it be whispered, an opportunity for any members of the audience who feel so inclined to make their escape.

* * *

Diagram Slides. While Mr. Dudley Johnston was altogether admirable in his precepts and practice as to the artistic presentation of landscape subjects on the lantern screen, he laid himself open to some criticism when he sought to consult the wishes of the members of the audience in the way of projecting the formulæ for the developers which he used. These were shown in white lines on a black ground, with the result that the lettering did not become distinctly visible until the lights were out, and then, of course, it was impossible to make a copy of the formula. Many lecturers, very inadvisedly we think, make a habit of using white-line-on-dark-ground diagrams and tables. One drawback to them is that in many cases it is impossible to direct attention to any item with a pointer, the latter being invisible to the audience against the unilluminated screen. A further disadvantage is the one to which allusion has just been made, namely, the impossibility of projecting the slide in a light which will still enable any notes being made by the audience. At many lantern lectures such as we attend at photographic societies we notice a strange disinclination to keep sufficient light in the room for this purpose even when showing slides which are fully able to bear it. The lecturer who uses a lantern in connection with technical discourses on photography should take a hint from the practice in university class-rooms, where fairly good illumination of the room is the custom.

* * *

“Supplementary Apparatus.” Many photographers are inclined to look with scepticism and disfavour upon the vest-pocket camera; yet there are times when such an instrument is of very real value. The fact that such apparatus is of necessity fitted with a short focus lens, and will give good definition over many varied planes of distance, has much to commend it on certain occasions. Recently we were looking at some negatives made with one of these cameras at some local celebrations following upon the signing of the armistice. The press camera generally used had broken down, and, almost in despair, the operator borrowed a small vest-pocket camera fitted with a large aperture anastigmat in a focussing mount, which was used with every success. In fact, the light at the time was bad, and the lens, which was used at its full aperture *without* stopping down, gave a much greater depth of field than could possibly be obtained with a larger instrument. One of the negatives gave a very good indication of this. The subject was a procession, and the first figures were almost as sharp as those at a greater distance. The only defect was a somewhat disproportionate effect between near and the more distant figures, but upon such matters as this the average member of the public is not critical. It must not be thought that we advocate the vest-pocket camera as a universal instrument in this respect: for general work it is certainly not a competitor with larger apparatus, but in special work it has decided claims; in fact it may be regarded as a supplementary instrument of great value. In proof of this we may give a further instance. A photographer was commissioned to photograph the gathering at a public dinner by flashlight. The usual equipment was taken, and, in addition, a vest-pocket camera, focussing by scale. Just before the exposure was made the tiny camera was focussed and put upon the top of the larger instrument, the same flash serving for the two. Little was expected of the small instrument, and it was surprising to find upon development that the small negative was the sharper and certainly the better of the two; and this was the negative from which the final prints (after enlargement) were made. Now that enlarging methods are in such general use, there is little difficulty, provided the negative is of good quality, in the way of making enlarged prints on bromide of any reasonable size.

* * *

Printing Frames. Few photographers give sufficient attention to their printing frames. Certainly the automatic bromide printer has done away with the ordinary frame to a very great extent, yet it is still necessary for certain processes, and is still to be found in use, or, perhaps it would be more correct to say, misuse upon the premises of photographers. Printing frames are among the cheapest items of photographic equipment, and if damaged are easily replaced. Yet if these are not in proper condition they may do serious, and sometimes irreparable, harm to valued negatives. There is no doubt that a collection of old printing frames is a menace to the photographer's negatives; and one frame, if out of condition, will do more damage than it will cost to replace it two or three times over. The stock of printing frames should be gone over periodically, and each frame carefully examined with a view to ascertaining if it is safe to trust it with a valued negative. A little warping may easily pass unnoticed, and a good plan is to lay the frame with its back removed upon a flat surface: if it lies flat it is a sign that it is not out of the true. An old negative may then be laid in position and pressure applied at each corner. If there is the slightest tendency to rock all is not well with the frame, and it should be discarded and preferably broken up in order to prevent any chance of its being used again during a rush when frames are short and there is a tendency to take risks. Springs, too, will be found to differ in the amount of the pressure, and if there is a great disparity the negative may be broken, although if the frame is quite true and free from warp this is not likely except in extreme cases. Weak springs may be improved by removing them and inserting a couple of copper burrs, such as are used for rivetting between the spring and the frame, though care must be taken not to overdo this. With regard to the choice of a frame, we always advocate the best quality as superior both in effectiveness and wear to the cheap article made of deal that is so frequently met with. The better article is well worth the extra cost. A few years ago we had in use a number of frames made from mahogany. These cost more in the first instance, but were superior on all points. Metal is in many ways ideal for the manufacture of printing frames, since it cannot warp or readily get out of shape, but we have yet to find a satisfactory metal frame in the larger sizes. Before the war Messrs. Houghtons introduced a frame of this type which was in every way satisfactory, but was made, we believe, in the quarter-plate size only. Perhaps now that the war is over we may look for something good in this direction.

NEGATIVE DEVELOPMENT IN PRACTICE.

In spite of all that has been written and said, the rationale of development is a sealed book to the majority of photographers. Some manage to secure a fair average of good negatives; some believe that they do so, not knowing how much better work is possible; while others frankly regard development as a sort of gamble which on one day gives a batch of thin negatives and on another a batch of thick ones.

To develop plates intelligently we must consider the nature and structure of the film. An ordinary bromide emulsion film on everyday plates resembles in structure a macadamised road on a microscopic scale, the bits of granite being represented by minute particles of bromide of silver, while the sand or earth between them is represented by the gelatine. When light, such as the image formed by a lens, falls upon such a film a change takes place in the nature of some of the silver particles; if the action be prolonged all are changed in their character, while with a very short light-action only a thin layer on the surface is affected. When such a plate is immersed in the developing solution a further change takes place, the exposed particles of bromide of silver being decomposed, the metallic silver remaining embedded in the film while the bromine is absorbed by the developing solution. We have thus in a negative a thick layer of particles of silver where the light-action has been intense, say a white collar in a portrait, and a thin layer where it has been weak, as in the shadows of the coat.

Now, we have to define a good negative, and this cannot be done by setting up any standard for universal acceptance. The negatives which are satisfactory to one skilled worker would be rejected by another, so that the only practical definition of a perfect negative is that it is one which gives you the kind of print you require, and the art of development consists in being able to produce such negatives with a reasonable degree of certainty. If it were always desirable to utilise the whole of the exposed particles of bromide of silver to form the final image development would become a mechanical operation: all that would be necessary would be to allow the plate to remain in the solution until this was accomplished, but such is rarely the case. To take a portrait as an example, if the whole of the silver bromide affected by the rays coming from the face is reduced, the deposit will be too dense as compared with that formed by the rays coming from the dark clothing. Therefore, we must arrest the process before this takes place, and the problem is to find out at what stage this has to be done so as to secure an image which will yield a satisfactory result with the particular medium we choose for printing. The usual way has been to judge the density and gradation of the image by inspection of the plate either by looking through it at the red light, by watching for the appearance of the high-lights at the back of the glass, or by watching the progress of development upon the exposed surface. With considerable experience, keeping to the same brand of plates, and a uniform light in the red lamp or window, fair results are obtained; but a better plan is to develop either for a fixed time at a uniform temperature, or to adopt some form of the factorial system proposed by Mr. Watkins.

Plates vary to a great extent in their behaviour in the developer. If we take two correctly exposed plates, one of ordinary rapidity and the other an extra rapid or special sensitive, we shall find that the former will attain density much more rapidly than the latter, so that it is impossible to develop them together in a tank or dish for the same time; we cannot judge by inspection of the back, for the image on the rapid plate will usually be clearly visible before the slow one shows a trace, although upon fixing it will prove to be far more dense; so that the only safe course is to follow the Watkins' system, and to estimate from the time taken for the image to make its first appearance the total period necessary to give the desired density. As an example, we will take an ordinary portrait exposure for which we intend to use a pyro-soda developer. The plate is placed in the dish, and, at the moment of pouring on the solution, we commence counting seconds until we can clearly see the outline of the figure. Let us now assume that Watkins suggests a factor of eight for this developer. Therefore we give a total of eight times this number of seconds, or, to put it into actual times, if the image appears in forty-five seconds, a certain density will be attained in six minutes. If upon fixing this density is approved of, then all similar plates may be developed for the same time and will be uniform in density, provided that the strength of the solution and the temperature remains reasonably constant. If greater density be required, a longer factor—say, ten or twelve—is taken; if thinner negatives are required a shorter one—say six.

The greatest mistake that can be made in developing is to curtail the development of an over-exposed plate and to prolong it for an under-exposed one. In each case exactly the contrary effect to what is needed is produced. Over-exposure gives softness, so does short development; the two combined yield a flat, foggy image, in which the high-lights are little thicker than the shadow detail. If, however, the developer were allowed to reduce practically all the silver acted on by light, the negative would be thick and muddy looking, but the high-lights would be dense and the shadows could be cleared with the ferricyanide reducer. In the case of the under-exposed plate long development has the same effect on the high-lights, but there is little or nothing to develop in the shadows, so that when we come to print we have nothing but "soot and whitewash." The great thing to remember is that development starts from the surface and that a thin image is quickly formed. With the over-exposed negative this gets thicker all over to a certain degree, but if sufficient time be given the maximum of contrast is secured; with the under-exposed one development should be stopped before the high-lights become too dense, and if the time system of development be adopted a good average result will be obtained in both cases. We once tried the experiment of exposing a spool of film on various subjects, purposely giving over and under exposures, and handed it to an expert in tank development. As we anticipated, every exposure yielded a printable negative; the over-exposed ones were thick and would have been slow printers, but upon reduction they appeared quite normal.

Too much importance cannot be attached to the two important factors of temperature and strength of developer. Tank solutions are weaker than those used for dish development, and cannot be used so long, although the latter, being more exposed to the air, are more liable to oxidise, while it is obvious that a developer made with warm water will quickly cool during development unless some precaution is taken to prevent it.

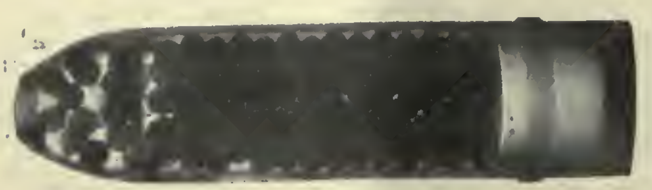
THE PHOTOGRAPHY OF METALS WITH THE X-RAYS

X-RAY photography has up to the present been essentially a medical science, with which pure photographic technique has often been far too little associated. A new branch of work has now been developed which links the X-rays with a branch of photography entirely non-medical, and it is likely to assume widespread importance in the near future.

In the early days of radiography negatives were made to diagnose fractures, to locate swallowed coins, or to show malformations of bone, and so on. Later, such subjects as stone in the kidneys were attempted, and as apparatus of greater penetrating power became available photographs were obtained of the heart, diseased lung tissue, and similar difficult subjects. The attention of manufacturers of apparatus became concentrated on the production of rays of greater and greater penetration, and two recent developments have proved so successful in this direction that we can now take a photograph through four inches of hard steel.

One of these is the modern high tension transformer, which takes the place of the induction coil in producing currents of very high voltage for exciting the X-ray tube. The other is the Coolidge tube, with which heavy currents of extreme penetration can be produced with a degree of uniformity hitherto impossible. The principles of the Coolidge tube are now familiar, and need not be enlarged upon here. The transformers used are of a type capable of giving a secondary voltage of between 100,000 and 250,000 volts, the penetrating power of the rays being proportional to the voltage applied to the tube terminals. Such transformers admit of exposures of the chest or heart being made with a single impulse—*i.e.*, in a small fraction of a second.

It may not at first sight be easy to form an opinion as to the value of this penetration. A few simple examples may serve to show it. A great deal of costly work may, for instance, be done on a casting for some machine part, only to find when finished that owing to an internal flaw or "pocket" the part snaps or breaks when subjected to working strain. Such a flaw could be detected before the part was worked up by means of a radiograph which would show the internal structure of the metal. Another instance is in the making of alloys, more particularly in the experimental work. In a number of recent experiments in which various substances were added to the alloyed metals to prevent the formation of small air bubbles, X-ray photographs of the samples revealed flaws as small as one sixty-fourth of an inch diameter. The photograph of a 75 mm. shrapnel shell seen in Fig. 1 shows how the internal structure of ammunition can be determined. Very numerous examples could be quoted, and no doubt now remains that radio-metallography is destined to prove of great value in various branches of industrial and engineering work.



Installations have been put up by many big engineering firms, such as by the Gnome aeroplane engine manufacturers, the Schneider and Creusot engineering works, and so on.

Needless to say, the apparatus must be specially selected and used with considerable skill and experience. Ordinary X-ray apparatus is unsuitable, though an induction coil giving a 16 or 20 inch spark with a Coolidge tube will give results up to a point. Special high tension transformers have been designed for the purpose by Watsons, and these, in conjunction with a specially selected tube, admit of exposures of two to three minutes penetrating two or three inches of hard steel.

An installation equipped for radio-metallography has been designed by M. H. Pilon, of Paris, with whom the writer has had the privilege of co-operating. The greatest possible precautions have to be taken against injuries from the rays, as it is fairly obvious that it is not an altogether easy matter to arrest them. We have found that five millimetres of lead, placed a metre distant from the tube, is tolerably safe, but most installations are so arranged that the operator controls the apparatus from a separate room or cabin, the dividing wall or partition being lined with heavy lead sheet, and observation of the tube made through a thick lead glass window, provided with a lead shutter that can be drawn immediately the tube is seen to be functioning properly.

The object to be photographed is provided with a lead diaphragm, and stood in its diaphragm upon the plate, the latter enclosed in a plate-holder with a special type of intensifier screen. The object is separated with felt from the plate to avoid secondary radiation. With a voltage of about 120,000 to 150,000 and a current of 2 to 4 milliamperes the exposure is made and the plate developed, preferably without bromide, in a rather concentrated solution. Intensification often assists matters.

A hole 1-64th inch diameter and 1-64th inch deep only, drilled in the upper surface of a block of steel two inches in thickness, will show distinctly in a good radiograph. This gives some idea of the powers of the rays to disclose minute flaws or faults.

It is a matter for conjecture whether we have yet found the best type of photographic plate for this work. The absorption of the rays depends upon the molecular weight of the substance, and with these rays of extreme penetration some salt heavier than silver bromide might seem advisable. Yet the ionising properties of the rays may cause an unstable salt of comparatively low molecular weight to be more sensitive than a heavier, more stable salt. Certainly up to the present no compound has been found more sensitive to the rays than silver bromide, and the special attention that has been paid during the last three or four years to X-ray plate emulsions has led to five or six times the rapidity of the earlier X-ray plates. This, in conjunction with the great reduction in exposure effected by the use of the intensifier screen, reduces exposure to very practical dimensions, though it may be observed that with the hard rays used in this work the intensifier screen does not reduce exposure in anything like the proportion it does in ordinary radiography.

T. THORNE BAKER.

LIGHT-SOURCES AND THEIR APPLICATIONS.

[The increasing use of enlarging as a method of making "prints" is one reason for keeping in prominence the optical conditions which condition the proper choice and use of a light-source for this purpose. As the writer (Mr. G. G. Cousins) of the following article in "American Photography" usefully points out, the arc-lamp in this respect is still far ahead of other light-sources. The use of reflectors in place of condensers in forming a convergent beam of light is another point touched upon by the writer, and no doubt one which is receiving attention by designers of new models of enlarging apparatus in which, as we have several times said of late, there is much room for improvement.—EDS. "B. J."]

LIGHT may be considered as the corner-stone of the structure of photography, and a knowledge of some of the principles underlying its use is necessary to successful photographic progress. The use of daylight is fairly well understood by photographers, but since the human race (photographers included) is becoming more and more dependent on artificial light it becomes advisable to learn something of its applications, limitations and advantages. Artificial light is considerably more flexible, steady and reliable than daylight, and can be more easily controlled and modified to suit different requirements. The different classes of work in which photographers use artificial light require different distributions of intensity, ranging from high concentration to broad diffusion. It is the purpose of this article to point out some of the principal characteristics of the light-sources in common use, a knowledge of which will result in a more efficient and economical use of such; economy here referring not so much to the cash value of light saved as to the shortening of the time necessary to produce results. For the intelligent use of artificial light-sources, auxiliaries such as reflectors and lenses are practical necessities, and in the following discussion the relation of lamps to such auxiliaries will be the principal features considered.

The use of artificial light by photographers may be roughly included in two classifications requiring respectively concentration and diffusion. In the former are included enlarging, reducing and lantern slide projection. The latter includes portraiture, still life, copying and printing.

Concentration.

In projection work light is required concentrated upon the comparatively small area of a negative or lantern slide. This area is enlarged or reduced as required, and in order that the projected image may be satisfactory the light must be fairly uniformly distributed throughout the image. This frequently necessitates some diffusion to get rid of the troublesome bright spot in the centre.

The diagram of Fig. 1 illustrates the conditions to be met. An image of the light source L1 is formed at O1 by the condensers C. By placing a transparency N (negative or positive) in the path of the rays the light is absorbed in varying degrees according to the opacity of N. If L1 is of very small dimensions, approaching a point, an image of N is produced out beyond O1. The smaller L1 is, the sharper the image of N will be. If now an objective lens be placed at O1 so that N is in its focus, the image of N will be corrected and the best possible optical conditions will be obtained. It will be noticed that L1 is on the optical axis. If L be moved to a position at L2 its image will be formed at O2, and if its position be at L3 its image will be at O3. It is plain that when the light source is at either of these latter positions the rays forming its image will not enter the objective lens, and are consequently ineffective. This condition exists when the ordinary vacuum tungsten lamp or the upright gas mantle is used, the light-source extending from L2 to L3, and it is evident that only a small portion of it near L1 is useful in producing an image of N. This illustrates the importance of having the light-source concentrated into as small space as possible at L1. In view of this fact, it is waste of money to buy condenser lenses and use them with an unsuitable lamp.

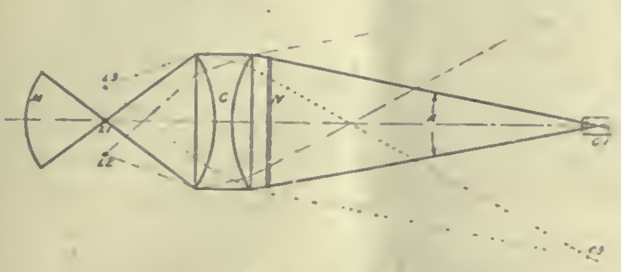


Fig. 1.

In fulfilling the above conditions the right-angle direct current arc lamp is supreme, with the headlight or stereopticon or focus tungsten a close second. The inverted gas mantle is fairly well adapted to this, but is of low candle power and extremely fragile, rendering it non-portable. Acetylene gas may also be used to good advantage. The particular type of lamp selected depends to some extent on the available source of supply. There is an important difference between the arc lamp and the other types mentioned—that is, that the arc lamp emits practically all of its light in a cone which is directed out from the positive crater (or in practice towards the lens). The other light-source emits light in all directions, and only a small proportion of it reaches the condensers directly without reflection. A reflector is thus of no value to the arc lamp, but when properly used produces a large gain in effective light from the other lamps. For the purpose under discussion a concave spherical mirror is the best, adjusted as shown at M, Fig. 1, so that the light-source is at its centre of curvature. This produces an inverted image of the light-source superposed upon the source itself. The filament of the tungsten stereopticon lamp is wound into a closely coiled spiral, and its position in the bulb such that there are spaces between the filament sections through which the reflected light passes. The result is that the effective light is nearly doubled. The increase caused by the reflection of gaslight is not as great as with the tungsten lamp, because of the continuous surfaces of the former not allowing light to pass through.

From a purely optical standpoint the direct current arc lamp cannot be beaten, but it possesses some disadvantages that in the aggregate will usually place it second to the gas-filled (nitrogen) tungsten focus lamp. In the first place, direct current is available in comparatively few locations. In use the lamp requires constant attention, and half of the power taken from the lines is wasted in the resistance. On the other hand, its light is more actinic than that of tungsten. The tungsten lamp operates equally well on any kind of current, requires no attention, and does not waste power in any resistance. Gas lamps are lower in actinic value than electric ones. The arc lamp on alternating current is, for several reasons, not worthy of consideration. Its light is unsteady, uncontrollable, subject to flicker, and very wasteful.

Particular attention has been drawn to the stereopticon tungsten lamp, because it is the only one that can approach the direct current arc in the results it produces. For ordinary photographic projection the regular gas-filled tungsten lamp may be used with good effect, although it is far less efficient. For home stereopticons or projectors for moderate distances the focus tungsten with a spherical mirror will give the best satisfaction.

A parabolic reflector acts in many ways like a lens, although it is not as accurate in its effects because of the difficulty of producing a perfect parabola. Its cost is, however, very small compared to a lens of equal diameter. This is the type of reflector used in headlights and flood-lighting units. Like the condenser lenses, it needs a very highly concentrated light-source for effective use. By changing the position of the lamp along the axis the beam is changed in shape, as shown by Fig. 2. With the lamp at the focus the beam will be formed of practically parallel rays. With the lamp forward of the focus the beam will converge, and if behind the focus the beam will diverge. A converging beam will be the most effective for enlarging or reducing.

It is important to select the shortest focal length reflector possible for use with a given lamp. The reason for this is shown in Fig. 3, which illustrates the relation between focal length and percentage of reflected light for a given diameter of reflector.

There is a method of illuminating negatives without condensers that has a very wide use at present. This employs diffusing, reflecting and transmitting materials. This method is capable of excellent results, but is very inefficient. By referring to Fig. 1 and assuming that the angle A represents the angle of view of a particular lens, it is readily seen that with diffusing surfaces all round the lamp only a very small percentage of the total light is directed within this angle. The greatest difficulty with this method is to get rid of the bright spot directly in front of the lamp without causing excessive absorption in diffusers. For this class of work a highly concentrated light source is not necessary, and is sometimes a disadvantage. It is desirable to produce even illumination with as little loss as possible. This means that the fewer diffusing surfaces there are to act on the light the better to keep down the loss. A good scheme to eliminate the bright spot is to paint a star-shaped figure on the lamp bulb with white water paint or frosting lacquer. Two or three attempts may be necessary to produce the best results, but it is well worth the effort. The best reflector to place behind the lamp is mirrored glass or polished metal, one that will produce a circle of reflected light large enough to cover the negative. Polished surfaces in general reflect far more light than roughened ones, and should be used when possible.

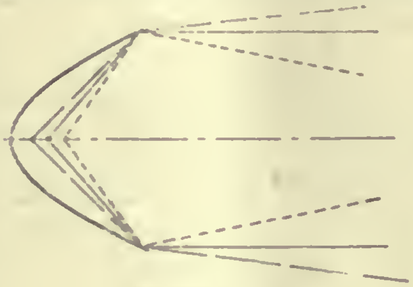


Fig. 2.

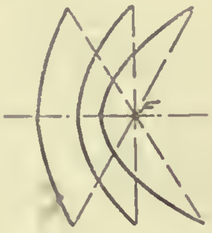


Fig. 3.

Portraiture.

With the advent of the gas-filled tungsten lamp portraiture by artificial light made a big jump in popularity. For this work broad diffusion of light is necessary. This is best obtained with a porcelain or paint-enamelled reflector, and, if necessary, a sheet of diffusing cloth, such as cheese or tracing cloth, in front of the unit. Angle reflectors are particularly well suited for this class of work. The ordinary gas-filled or the photographic blue-bulb gas-filled lamp may be used. The latter is the same as the former, except the bulb of the latter is of a specially developed blue glass that screens out the unnecessary highly luminous red rays without lowering the value of the chemical or actinic rays. This lamp was developed for use with colour-blind plates, with which it is most effective. Its special purpose is to decrease the visual glare that may cause the eyes to appear unnatural. The loss of red rays would be a disadvantage when using panchromatic or orthochromatic plates.

Copying and Still-Life Photography.

The rendering of neutral colours is simple with the regular gas-filled tungsten or gas mantle lamps, but when colours are encountered a little care is necessary. Tungsten lamps are red in comparison with daylight, while gas mantle lamps are greenish, and this necessitates the altering of the factors of ray filters. Daylight units are obtainable in both tungsten and gas lamps, that give a very close approximation to average daylight colour. These may be the bluish glass globes of the lamps themselves or the addition of the proper bluish glass screens over the open end of reflectors. Reflector equipment such as is used in portraiture will generally be satisfactory for the purpose under discussion.

Reflectors.

The selection of lamps and reflectors should be made with due regard for the characteristics of each and to the purpose for which they are to be used. The purpose of reflectors is to secure control of light, but different reflecting materials are widely different in their light-controlling properties. In the order of their effectiveness they may be classified as follows:—Polished metal, mirrored glass, prismatic glass, aluminium paint, enamel, white glass, and white paper. The shape of reflectors made of the last three materials has very little effect on the distribution of light, except that a deep bowl intercepts and acts on more of the light of the lamp than does a shallow reflector, and all three are of diffusing characteristics. White paint is used considerably as a diffusing reflector, but paints mixed with oil turn yellow (less actinic) with age much more than paints mixed with water.

Some Test Results.

In order to make comparisons between the various conditions described in connection with projection a few tests, as outlined below, were made to determine the percentage of the total light flux from the lamp that actually reaches the plane where an exposure is to be made under ordinary photographic conditions.

An 8-volt automobile headlight lamp was used. Such a lamp has a highly concentrated filament, which is well suited for use with condensers and focussing reflectors, and is easily adapted to the other conditions as well. The total light from this lamp was measured in a sphere photometer, and was considered as 100 per cent. in preparing Table 1. A camera with the ground glass removed was used so as to produce actual enlarging conditions.

The set-up for the test was exactly as shown by the heavy lines of Fig. 1. The lamp was placed at a suitable distance from one side of a pair of 4½-inch condensers, and the camera was placed on the other side, with its lens at the point where the image of the light source was produced by the condensers. In actual use the reflector should be properly adjusted relative to the lamp, as previously described; then rigidly fixed, so that they can both be moved together as a single unit. Focus the image of the negative in the usual way, then adjust the combined lamp and reflector horizontally until the desired condition is obtained. A piece of ground glass upon which black lines were ruled was placed in the condition normally occupied by a negative. With a white screen the plane was found where sharp images of the lines were produced. This gave an enlargement of 3.6 diameters, which was maintained constant during the succeeding tests, the distances from the negative plane to the image plane remaining the same. An illumination photometer was then set up, with its test plate in the plane previously occupied by the white screen. The ruled ground glass was removed and the intensity of illumination was measured at the centre and at the edges of the light area. From these measurements the total amount of light falling on this area was computed. In Table 1 this value is expressed as the percentage of the total amount of light from the lamp. To those unfamiliar with measurements of illumination these low values may seem unbelievable, yet they only emphasise the need of care to secure as much useful light as possible from the lighting unit.

The first test was made with condensers, but without a spherical reflector. The second test was a duplication of the first, except that a spherical reflector was used. The reflector increases the useful light 1.8 times. Under these two test conditions the light was so uniform that no diffusion was needed, and consequently none was used. Uniform illumination under these or similar conditions is largely a matter of adjustment. For the three succeeding tests it was found necessary to diffuse the light somewhat, and one thickness of tracing cloth was used. The third test was made with a standard 8-inch automobile head lamp placed close up. The lamp was adjusted to produce the brightest and most uniform lighting. The fourth and fifth tests were made with the lamp in a white-lined box, No. 4, without any other reflector, and No. 5, with an 8-inch concave spherical reflector behind the lamp. Here, again, the value of the reflector is evident. It might be stated that the optical quality of the 8-inch spherical reflector was much better than that of the parabolic head-lamp reflector, which accounts considerably for the better results from the former.

TABLE 1.

No.	Test Equipment.	Per cent. of Light Effective.
1.	Automobile lamp, 4½-inch condensers, without reflector..	1.53
2.	Automobile lamp, 4½-inch condensers, with spherical reflector	2.79
3.	Automobile lamp, with 8-inch automobile head-lamp ...	0.05
4.	Automobile lamp, white-lined box, without reflector ...	0.013
5.	Automobile lamp, white-lined box, with 8-inch spherical reflector	0.268

It is hardly necessary to state that with such a low-power lamp the illumination was too weak for practical work, except under condition No. 2. As the purpose of the test was to determine the utilisation efficiency, the actual candle power was not important, and the lamp was satisfactory for the purpose.

George G. Cousins.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Some Notes on Engineering Photography.

Photography is essential to an engineer. New engines, ships, machines, and machine parts, etc., must be photographed; tracings have to be printed, and specifications and tenders are copied, all of which is photographic work. Some concerns have their own photo department, with staff from one upwards; others send for some local man as occasion demands. The former is probably the most satisfactory arrangement, viewed from either the standpoint of the engineer or that of the photographer, and it is of such work that I wish to speak. A position as photographer with engineers—unless the particular manufactures are of a small nature—is eminently a young man's job, and judging by experience I had of it, a pleasant and very profitable job, too. Unfortunately, perhaps, these posts are not very plentiful, and, moreover, they are not often vacant. The reason for this latter can best be explained I think, in the words of a director of one of our largest shipbuilding concerns, who once told me that: "We have a photographer, and as I see no possible reason for his leaving us this side of the grave, we are not likely to have need of another." Vacancies of this kind do occur though, and judging by what another engineer told me, they are none too easily filled. I was given to understand that it was very difficult to find even among photographers of long experience, men capable of the particular requirements of engineers. This need not be the case; engineering photography is more interesting than difficult, it is only necessary to tackle it in the right way, and not expect it to conform to methods used in the studio.

When applying for an engagement, it is necessary to be very explicit, as many engineers, for some unknown reason, call the blue printer the photographer. (What they term the photographer very often depends on how they feel at the moment.) The usual duties include the taking of negatives, development and painting out of some, and numbering and titling. Printing and enlarging and the keeping of an index or two complete what we might call ordinary photography. Besides this, there is usually "Photo-statting" of business papers, drawings, etc., and blue printing, though this is sometimes a job in itself, the blue-printer having that alone to attend to.

When photographing machines a lot depends on the machine itself, its position, and its surroundings. Should it be a small affair, easily moved, it can be arranged as one might arrange a sitter for a portrait, only it is advisable to have a word with the draughtsman responsible for the drawings of it before exposing. He will point out important details. With large and cumbersome machines there is usually some difficulty, and it is here that youth triumphs, provided there is a little technical knowledge added. A machine may lie in such a position that there is no room to manœuvre in, and no decent view can be obtained from the ground. In such cases it *may* be necessary to photograph parts of the machine only; but before doing that one should look up. There are any amount of vantage points in a machine "shop"; I have had first-rate negatives from the rails of an "O. E. T." crane, with the camera suspended from a roof girder, two legs being jammed in the cogs of the crane. If these stunts are too risky, a platform of cases can easily be built up to any height if a request is made to the foreman. Needless to say, a battery of lenses is essential: very few jobs come within the range of any one focal length.

A favourite view with engineers is the isometric. To obtain this one must imagine the machine to be in a square-cornered box, and the view obtained showing one corner with the three edges radiating at equal angles. This necessitates an elevation of some sort for the camera, and if a wide-angle view is being taken, distortion must be carefully guarded against.

Before printing is reached, the negative often has to be painted or blocked out. This needs a good desk, a few brushes, some Indian red water-colour, and a ruling pen. Efficiency is obtained by practice only, and the learner must not rush, a week of slow practice being quite sufficient, as a rule, for most jobs anyway.

The Photostat is an automatic camera for copying to scale. The print or document to be copied is laid on a table, and sizing and focussing arranged by rack and pinion. The image is thrown on to bromide paper, which is kept in the camera in a roll. The exposed part is cut off by a lever, and pulled into a developing tray, thence into a fixing trough. A detailed description of this camera was given in the "Professional Photographer" early this year, but a close-acquaintance is sufficient for any capable photographic assistant.

Blue printing has been described as child's play. Sometimes it is; sometimes not. If the drawing-office requirements are blue prints only, in small numbers, and the old system of printing is in vogue, then it is child's play, and the draughtsmen themselves will show the uninitiated how it is done. At the same time, the pay on this job (blue printing only) is in some places good. Blue printing very often includes "white" printing as well, and sometimes the "true-to-scale" process; but as these were the subject of a "B.J." article some few months ago (July 19), there is no need for further descriptions.

Taken all round, the engineer's photographer is likely to have a good time, and, comparatively speaking, to do well. I look back on my own experiences amid steam hammers, pneumatic rivetters, and O.E.T. cranes, with the greatest pleasure. THERMIT.

FORTHCOMING EXHIBITIONS.

October 14 to November 30.—Royal Photographic Society. Secretary, J. McIntosh, 35, Russell Square, London, W.C.1.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications November 4 to November 16:—

OPTICAL PROJECTION.—No. 18,227. Apparatus for projecting images upon a screen. R. O. Harmes and E. Polack.

CINEMATOGRAPHY.—No. 18,160. Cinematograph projectors. T. Royle and W. Whitehead.

CINEMATOGRAPHY. No. 18,230. Motion picture machines. B. Stechbart.

X-RAYS.—No. 18,358. X-ray photography. G. S. Whitfield.

MAGNESIUM LAMPS.—No. 18,769. Magnesium lamps for photographic use. G. P. Hansen.

CINEMATOGRAPH-PHONOGRAPH.—No. 18,521. Synchronising optical effects of cinematographs and acoustical effects of phonographs. E. S. Hopkins.

STEREOSCOPY.—No. 18,613. Production of photographic records with stereoscopic effect. R. B. A. Johnson.

CINEMATOGRAPHY. No. 18,512. Cinematography cameras and projectors. C. Kearton.

MAGAZINE CAMERAS.—No. 18,544. Loader magazine frame for photographic cameras. C. R[illegible]hmeyer.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

CINEMATOGRAPH SHUTTERS.—No. 118,904 (Sept. 25, 1917).—The invention relates to shutters in which the portions obscuring the light during the movement of the film are semi-transparent. According to the invention, the portions of the shutter which diffuse the projecting rays are formed on one side thereof with parallel grooves having flat bottomed perpendicular sides and on the other side thereof with a rippled or wavy surface, the ripples or waves extending in the same general direction as the corrugations or grooves.

The parallel grooves provided on one side of the shutter have their bottom walls preferably parallel to the plane of rotation of the shutter, their side walls being then at right angles to the plane.

The shutter may comprise one or more vanes, each consisting of a light-diffusing portion and a shank portion, the shank portion as well as the edge of the light-diffusing portion being covered with opaque material, and the shutter is preferably made of transparent material which prevents the passage of ultra-violet rays.

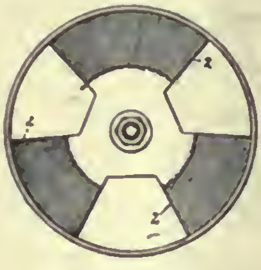


Fig. 1.

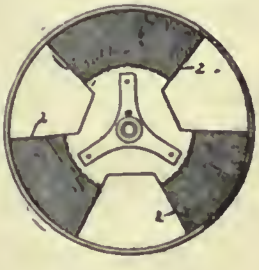


Fig. 2.

In the drawings each of the vanes 2 is preferably of glass or other transparent material which, when passing predeterminedly transversely of the light-rays from the illuminator within the projecting apparatus, diffuses the light-rays sufficiently to project on to the usual screen a substantially constant area and amount of illumination. In fig. 3 is shown a horizontal section of one of the vanes, provided with a number of grooves which are formed parallel with one another and the intermediate one of which is substantially radial to the centre of rotation. As shown in fig. 3 the bottoms of the grooves between corrugations are flat and substantially parallel to the plane of rotation, while the side walls of the grooves are perpendicular to the bottom walls. The other face of the vane is made with a rippled or wavy surface, the ripples extending in the same general direction as the grooves. It is found that with this combination when the vane is in front of the lens while the picture is changing no outlines of the picture reach the screen, but instead they are only diffused or out of focus, and there is no change in the size of the area of projected light on the screen, neither does the amount of illumination vary substantially.

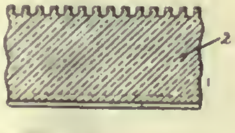


Fig. 3.

For the sake of better lighting effects and to guard against leakage or aberration of the rays, the surfaces of the shanks of the vanes may be covered with some opaque substance, as, for instance, black pigment, and the same may also be applied to all of the exposed edges of the vanes.

To prevent, in part at least, the injurious effect, resulting from the use of the usual arc light, of the ultra-violet rays, the vanes 2 of the shutter are preferably made of such glass as will filter out the rays. In the construction shown, the open spaces between vanes or sectors will naturally permit the passage of ultra-violet rays, and where it is deemed expedient to prevent their passage entirely, their open spaces or sectors may be filled with plane moulded glass of the filtering nature referred to above, or the entire shutter may be made of the same kind of glass, corrugating certain sectors thereof, the plane sectors in such case permitting of the free passage of light from the projector to the screen, while the film is stationary, the corrugated sectors again diffusing or destroying, while the film is moving. Frank Clarendon Hamilton, 11, East 32nd Street, New York.

Trade Names and Marks.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

Pyrogallic Acid Crystals (Design).—No. 383,955. Pyrogallic acid made in England. John Leonard Rose, trading as J. L. Rose, the Old Gas Works, Abbey Road, Barking, London, E.; chemical manufacturer.

REGISTRATIONS RENEWED.

Nickello.—No. 268,592. By A. W. Penrose and Co., Limited, in 1904. (Class 14.)

Scaloids.—No. 267,650. By Johnson and Sons, Manufacturing Chemists, Limited, in 1904. (Class 1.)

Sinyl.—No. 266,973. By Newman and Guardia, Limited, in 1904. (Class 8.)

Ticka.—No. 267,477. By Houghtens, Limited, in 1904. (Class 8.)

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, November 30.

Huddersfield Naturalist and Photographic Society. "Underground Yorkshire." W. Parsons.

Monday, December 2.

South London Photographic Society. Lantern Printing. J. Nixon.
Bradford Photographic Society. "Pictures." Butler Wood.
Ilford Photographic Society. Annual Exhibition opens.
Dewsbury Photographic Society. "The Perfect Negative, and How to Obtain It." A. E. Granville.

Tuesday, December 3.

Royal Photographic Society. "Home Portraiture." W. F. Brigham.
Manchester Amateur Photographic Society. Beginners' Night.
Halifax Scientific Society (Photographic Section). "Members' Prints." Criticism by Members.
North Wilts Field and Camera Club. "Gloucester Cathedral." G. Embrey.
Dennistoun Amateur Photographic Association. Whist Drive.

Wednesday, December 4.

Croydon Camera Club. "Some Darkroom Dodges and Workroom Wrinkles." V. Jobling.
Edinburgh Photographic Society. "Photographic Technique." A. Smith.
Leicester and Leicestershire Photographic Society. Fifty Prize Prints from the "A.P." and "P."
South Suburban Photographic Society. "Palestine as I Saw It." P. R. Salmon.

Thursday, December 5.

Brighouse Photographic Society. "Halifax in the Coaching Days." H. P. Kendall.
Huddersfield Naturalist and Photographic Society. "Cornwall and Devon." L. Neaverson.
Hammersmith Hampshire House Photographic Society. "A Chat on Pictorial Photography." S. A. Bridgen, F.R.P.S.
Rodley and District Photographic Society. Monthly Competition, "Chrysanthemums."
The Camera Club. "Sea Power and Victory." A. H. Pollen.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, November 26, Mr. Dudley Johnston in the chair.

Mr. H. S. Starnes read a paper on "The Gum-bichromate Process with a new Colloid." He referred in the first place to the uncertainty of the gum-bichromate process when the colloid was gum arabic. He had found that with certain samples of gum arabic there was an unmistakable reversal of the image—that is to say, a negative print was produced from a negative. Mr. Starnes attributed this to such samples of gum arabic being differently affected by light in the presence of bichromate. He believed that the first action of light was to render the bichromated gum soluble, insolubility following as the result of further exposure. He had found that these irregularities could be avoided by making use of gum senegal, according to a special sensitising formula, instead of gum arabic. His sensitiser consisted of gum senegal, sodium bichromate, alum and hydrochloric acid, containing also the necessary pigment. The gum senegal was softer and less brittle than gum arabic. It was kept in solution of strength such that one fluid ounce weighed 9 drachms. Very little of the sensitiser was required to be used, not more than one minim per four square inches, equivalent to 20 minims for a 10 by 8 sheet of paper. The paper he found best for the process was a gelatine-sized one, made before the war for collotype printing. It possessed a certain grain which held the pigment coating. Exposure of the sensitised paper was about one-eighth the time for P.O.P. For development the paper was soaked in water for about a minute and then immersed in a diluted solution of alum and hydrochloric acid in which the image rapidly appeared. For the case of over-exposure the acid alum solution was used stronger; and the lecturer explained the very great advantage which could be taken by developing with a jet of water directed through a fine nozzle.

A large number of prints by the process were passed round, and the lecturer also exhibited examples of prints by his method, coloured with oil-colours largely diluted with turpentine, and presenting a resemblance to water colour drawings.

Some discussion of the paper followed, and the hearty thanks of the meeting were accorded to the lecturer by acclamation.

CROYDON CAMERA CLUB.

After the playful contest that raged round Mr. Clifton's previous exposition, some results of real warfare, due to the blonde beast, were sadly illustrated by Mr. E. W. Harvey Piper, F.S.A., last week, who gave a lantern lecture on "Two Great French Cathedrals."

As will be guessed, they were those of Rouen and Rheims, respectively, the beautiful and the incomparable, using these adjectives as regards the latter chiefly in a past sense. Rouen has been but slightly damaged, but Rheims has suffered grevious injury, and much of its priceless and magic art has gone never to return, however skilfully the ruins may be restored. Remembering that no possible excuse based on the exigencies of war can be offered for the destruction deliberately wrought, it is difficult to understand the mentality of a people putting on record for all time the evidence of wanton outrage and infamy, which will ever raise contempt and loathing for a race sunk to the lowest depths of moral decadence. From all accounts the Saxons must in fairness be excepted, but otherwise so much for Kultur!

Mr. Harvey Piper is one who loves the old stones of Rheims with a great love, and his grief and anger at what had been done by the Hun communicated itself to all. Even that type of "commonsense" businessman who would buy his goods from Germany to-morrow if he could, provided they were fractionally cheaper than others, might have felt a qualm of conscience had he been present.

By means of a large number of excellent slides from many negatives taken prior to the war, and others quite recently, the terrible damage inflicted was clearly shown. The lecture was by no means confined to this: the past splendour of Rheims, and the beauty of Rouen being well brought out, and in a most interesting way. The attendance was good, considering that the weather conditions were such as to cause quite near planes to recede atmospherically with exceeding abruptness.

◆

Unprohibited Photography Again.—An Order in Council was made on Tuesday last, repealing a number of the Defence of the Realm Regulations. Some of the regulations now formally repealed have been practically in abeyance since the date of the signing of the armistice—particularly those relating to air raid precautions. Regulation 19, with regard to sketching and photography on the coast and elsewhere, is revoked, and the authorities will rely, as before the war, on the provisions of the Official Secrets Act, 1911.

News and Notes.

Messrs. J. H. Dallmeyer and Co., Ltd., of Church End Works, High Road, Willesden, N.W.10, advise us that they are once more in the position to receive inquiries concerning their lenses. They inform us that they have taken advantage of the last four years in improving their methods of production, and incorporating the latest type of machinery, which will enable them to supply instruments of an even greater degree of perfection than was obtainable prior to the war.

British Science and Invention Exhibition.—In view of the wide public interest taken in the British Scientific Products Exhibition held at King's College, London, during the past summer, the British Science Guild has decided to organise another exhibition next year. The main object of the exhibition will be to stimulate national enterprise by a display of the year's progress in British science, invention, and industry. Further particulars of the exhibition will be available in due course. A large part of the recent exhibition has been transferred to Manchester, where it will be on view at the Municipal College of Technology towards the end of next month.

Press Photographer's Death.—The prevailing epidemic (so we read in the "Newspaper World") has claimed a victim in Mr. H. J. Pearce, one of the most popular of Press photographers. Unsuited to a military career, Mr. Pearce took over the control of News Illustrations when the owner-manager of that firm, Mr. S. E. K. Richardson, joined the army, and was ever ready to devote his camera and the staff at his disposal to the service of the national weal. During the Red Cross Floral Exhibition at Trafalgar Square, Mr. Pearce took a charming picture of Mrs. Lloyd George at a stall, obtained the consent of Mrs. Lloyd George to autograph the picture, and then offered it for sale to the highest bidder, devoting the proceeds to the funds of the Red Cross. He leaves a widow and a little child, for whom a subscription list has been opened and to which Mrs. Lloyd George, mindful of Mr. Pearce's own good offices, has subscribed.

Death of Mr. Walter Pouncy.—News only just reaches us of the death, last month, of Mr. Walter Pouncy, for many years in business as a professional photographer at Dorchester, Dorset. Mr. Pouncy will be remembered as the son of John Pouncy, notable among photographic experimenters of the last century through his invention of the gum-bichromate process and method of producing enlargements in oil colours. The son assisted his father, and followed his profession in the Dorset county town, where he obtained a creditable reputation, not only in portraiture, but, perhaps more particularly, as a maker of topographical landscape photographs. Until almost the end of his life, at the age of 74, he continued to take an amateur's interest in the technical side of photographic processes. Under a *nom-de-plume* he was a contributor to many discussions of technical topics in the correspondence columns of the "B. J."

Colloidal Silver.—During a silver recovery from residues the following perhaps unusual change took place. The silver chloride was converted to the oxide, Ag_2O, in the usual way, and thoroughly washed.

To show its reducing power formaldehyde 60 per cent. was used for the ultimate reduction. This operation was carried out in a vessel containing a mechanical stirrer. At room temperature, 14° C., reduction was slow, and nothing out of the ordinary happened. On raising the temperature to 35° C. reduction was accelerated, but the liquid was found to be acquiring a pale lilac tint increasing in intensity as reduction proceeded. This solution passed unchanged through ordinary filter-papers, and has been preserved since the experiment—June, 1917. The colour of the solution is now a rich ruby-red.

The experiment was repeated using acetaldehyde, but no similar result was obtained. Possibly the acetic acid produced, less volatile than the formic acid produced above, was sufficiently ionised to ensure immediate coagulation of the colloidal particles formed.

Further experiments dispensing with continuous stirring and elevation of temperature gave no result in several cases, and in others only after several days, the colour produced being only slight.

There seemed reason for suspecting colloidal silver. The following experiments gave some support to the idea:—

1. The colour was discharged by salt solutions, though only slowly. Nitric acid was most effective especially on warming.

2. Hydrogen peroxide was slowly decomposed on slightly warming. The peroxide solution was, however, very dilute—4 volume.—Alwyn Pickles, B.Sc., in "Chemical News."

The British Scientific Instrument Association, one of the earliest associations formed under the scheme of the Department of Scientific and Industrial Research, has secured premises at 26, Russell Square, W.C.1, where offices and research laboratories will be equipped. The first chairman of the association was Mr. A. S. Esslemont, whose recent lamented death has been a severe loss to the association. The council has elected Mr. H. A. Colefax, K.C., as chairman to fill the vacancy. The vice-chairman is Mr. Conrad Beck, to whose energy and personal influence is largely due the successful formation of the association. Almost all the leading optical and scientific instrument manufacturers are members. The Department of Scientific and Industrial Research is represented by Major C. J. Stewart, Capt. F. O. Creagh-Osborne, R.N., Mr. S. W. Morrison, Col. R. E. Home, R.A., and Mr. Percy Ashley. The council has recently co-opted as members of its body the Hon. Sir Charles A. Parsons, F.R.S., and Prof. J. W. Nicholson, F.R.S. Sir Herbert Jackson, K.B.E., F.R.S., has been appointed director of research, and Mr. J. W. Williamson, B.Sc., secretary of the association.

Motion Pictures of Metal Stresses.—The "Scientific American" records that an Illinois professor has used the cinematograph camera in conjunction with the microscope for the disclosure of stress in metals. A moving reproduction was taken and vividly projected on the screen of the successive changes which take place in the structure of crystals of wrought iron when subjected to alternate bends or blows. The piece of iron was placed in a bending machine. The microscope was attached to just over the place or point where the iron was most affected and a cinematograph camera was attached to the microscope. As the piece of iron was bent back and forth the effect in the breaking point was recorded through the microscope and in the camera. About one three-hundredth of a square inch of area of this iron was thus reproduced. The effect was remarkable, each minute change in the structure and crystals being accurately reproduced until the piece broke. The gradual progression or formation of the cracks or weakening lines was distinctly visible.

It is believed that the new idea will be successfully applied to steel, non-ferrous or copper metals, and other alloys in the near future. Besides explaining many interesting phenomena not now fully understood it may settle some controversies which otherwise would remain open much longer. It may determine just how steel as well as iron really deteriorates or weakens under stress, whether through the crystal or in some other way. Such an investigation might lead to a heat treatment prolonging the life of certain steels and making them less liable to fatigue, as it is called, or to gradual or sudden deterioration. The conclusion is evident that such an accomplishment might assist in prolonging the life of important members, cables and ropes for elevators, etc., conserving life and material as well.

French War Photographs.—The official French war photographs now being shown at the Goupil Gallery cover a wide field of illustration. They depict (as printed by the "Times") not only the French Army and Navy at war, but the French people working in the background; and, even more important than this, from the Red Cross point of view, they convey a vivid idea of the sufferings of the country under the heel of the German invader. A particularly fine picture brings Rheims Cathedral prominently before the eye, with the ruined houses and other buildings of the city around this central point. Yet Rheims, though the most notable, is only one of many examples of vandalism here presented or indicated. From Arras and Péronne, in particular, come scenes of desolation and wanton destruction, which, with the smaller studies of French refugees striving to make a home among crumbled brick and stone, suggest that peace will not bring a truce to the warfare of the Red Cross against human suffering. The deep wounds of the devastated regions of France remain to be bound up.

Some of the most effective photographs deal with the French artillery. There is one of a large naval gun adapted for use on the Western front, which, apart from its subject, is artistically impressive. Another, of an anti-aircraft gun in the Ægean, proves that the coloured photograph can render atmosphere. Sunlight comes admirably into two or three pieces from Alsace, where scenes relatively peaceful form a pleasant contrast to the widespread riot of shot and shell.

A photograph covering many feet of wall space is an admirable bit of realism. Taken from the air, it shows the advancing French troops digging themselves in as they take the ground, and signalling to the airmen, by white shields on their shoulders, that the barrage may go forward. The smoke screen, on one side of which the French are advancing, while on the other the enemy are retiring, is a second graphic picture from the Somme. The Aisne contributes the successful culmination of a French attack, illustrated on the large scale.

As a battle piece nothing could be more thrilling than the aspect of the fight for Fort Douaumont at Verdun, which, in its pictorial vigour and fury, reminds one of more conventional battle-pieces by imaginative painters. But no artist has dared to paint the realities of war as the photograph has recorded them, in views of the dead in the trenches, of horses slain by the roadside, of the long miles of earth turned barren.

After gazing, say, at the poilu cutting his way through a wilderness of barbed wire on the Aisne, it is well to be reminded of the support the women of France have given the men. One sees them toiling in the shell factories, at the ports, at the camouflaging of guns, on the farms, in the collieries. And, with somewhat of relief after so much labour of war and industry, one comes on a photograph which seems like a summing-up of the gratitude of France to her children—the presentation to Foch of the bâton of a Marshal of France.

The exhibition will be open daily, from 10.30 to 5, until January 4.

Correspondence.

•.• *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

•.• *We do not undertake responsibility for the opinions expressed by our correspondents.*

MATTERS OF PROFESSIONAL MOMENT.

To the Editors.

Gentlemen,—The note struck by Mr. Foster Brigham in his letter of last week's issue regarding the P.P.A. is good in many ways, although I do not agree with all his points. One is glad to see a member expressing himself through the Press.

Personally, I would covet suggestions from all sources; it stimulates interest and, moreover, assists progress, and at this moment if we in England do not make progress in all sections of trade and society it will be the finest opportunity thrown away. I want to see us as a profession take a very prominent part in our New England, in the new world.—Sincerely yours, MARCUS ADAMS.

The Camera Club, 17, John Street, London, W.C.

To the Editors.

Gentlemen,—No one, I think, would wish to see the P.P.A. in the unhappy state depicted by Mr. Foster Brigham, and it was not my intention to convey such an idea. The Associate section would, of course, have to be distinct and apart, and as a section of the P.P.A. could be controlled by a separate council under the parent body.

Everyone must realise it is an exaggeration to imply that the apprentice could attend a business meeting of employers. Otherwise, Mr. Brigham's illustration of the sergeant's mess is excellent as far as it goes, but we must remember that while there is, in this photographic army, a sergeants' mess and an officers' mess (council), there is no canteen for the rank-and-file. Now, it is up to the higher ranks to see that the men get photographic refreshment and entertainment suitable to their needs. This is not compromise.

"Human nature values the exclusive," says Mr. Brigham; but he appears to forget it when talking of assistants, and would give benefits to one and all, under some free scheme, through the employers. If anything is worth having 'tis worth paying for, and they should support their "canteen" to obtain benefits. This something for nothing principle is wrong. There is too much of that feeling among many still outside the P.P.A. They get general benefits that others have combined to obtain. As one such put it to me, "Why keep a cow when I can get milk for nothing?" Truly selfish, but it is the feeling some have. What benefits will assistants receive through such employers?

The Broad Acres are a trouble in any county scheme. Many employers would be unable to reach the arranged centre, while there must be hundreds of assistants who are out of reach of art and technical schools.

These are difficulties to be overcome, and the more light we can get on this subject the better.

Under the present arrangement (?) for the independent forming of societies what are those to do who are outside the prescribed areas? Is there to be a vacuum between this and that independent body? Organised by the national society the divisions could be so arranged as to include every district.

I count myself fortunate in having once met Mr. Brigham, and hope I may again have the opportunity at the next Congress. Meanwhile I am pleased to have his admission that a strong assistants' union is desirable, and shall look forward to seeing his support of any movement toward an Associate Section of the P.P.A.

This is surely to be preferred to an independent Assistants' Labour Union.—Yours faithfully,

T. HORACE CHAPMAN.

15, Cleveland Street, Stourbridge, Nov. 25, 1918.

FLASHLIGHT POWDERS.

To the Editors.

Gentlemen,—In your article under "Ex Cathedra," issue of September 21, under "Flashlight Portraits," we regret to have read the assertion that "Flash powders rapidly deteriorate (?) in actinic power after mixing"; also, "The moral is not to mix more than is likely to be required for the job on hand. This also tends to safety, as it prevents risk of accidental explosion of a large quantity of the mixed powder."

By a strange coincidence, the same mail brought us a letter from a professional photographer in Scotland, which modesty forbids our reproducing here in full. We hold no brief for any other powder manufacturer, and can speak only for ourselves. But we do not hesitate to state that tests have shown repeatedly that there is no loss of actinic values in powder that we have kept in our laboratory for several years for the purpose of learning what chemical changes (if any) our samples would undergo, and whether there would be any appreciable caking after a couple of years.

While the present embargo is effective, we shall be debarred from shipping flash powder by passenger steamers, although we are allowed to ship some powder, as the result of tests made by our Government at its Washington laboratories. The present handicap is not, however, due to "explosive features," but because it will not do for the authorities to discriminate in favour of one concern. To-day we were paid a good amount by the War Department for powder furnished in cartridge form for photographic purposes. In no circumstances do we allow our flash powder to be shipped unless it has been mixed thoroughly and is ready for instant use. Very fortunately, there is no known case of an explosion of our brand. We thought you might be glad to impart this information to your readers. The Scotch testimonial is based on a small lot of flash powder which we were allowed to ship some months ago.—Fraternally yours,

Prosch Manufacturing Co., Inc.
(Edward J. Wessels, Prest.).
213, Pearl Street, New York, Nov. 6.

AERO-PHOTOGRAPHY : AN HISTORICAL NOTE.

To the Editors.

Gentlemen,—The article on aero-photography published on page 526 of last week's "B.J." is of exceptional interest at the present time, for although many of us knew that photography was doing a lot in the way of helping to win the war, few outside the official aero-photographic circle knew to what a remarkable extent the camera was being used.

History tells us that photographs were first taken in the air—from a balloon—by Nadar, of Paris, in the year 1858, but it is his adventures with a camera in a balloon during the siege of Paris forty-eight years ago that one often hears about, his early attempts being overlooked by most people who write paragraphs about aero-photography.

As little appears to be known about the early career of this famous Parisian photographer and his taste for ballooning, I have been making a few investigations, and some fact I have gathered may be of interest now that aero-photography is very much "in the air." In the year 1865 Nadar published a most readable book, bearing the title "The Right to Fly," and the Preface to it was written by that famous literary lady of the period, "George Sand." The volume advocates most strongly the heavier-than-air type of flying machine, but, as a photographic journal is no place for Nadar's arguments, I will confine myself to a few biographical details of this famous photographer.

Nadar's christian name—which nobody seemed to bother about—was Felix; he was born in Paris on April 5, 1820, and was the son of a Lyonnese bookseller On leaving school he became a student at one of the schools of medicine, where he remained for about two years and a half. Not having much cash, he found himself obliged to earn money during the time he was studying medicine, and having literary tastes he commenced, when only sixteen years of age, writing for the newspapers. Journalism was found by Nadar to be a more profitable career than he imagined it to be, with the result that he gave up all thoughts of becoming a doctor and attached himself to the "Le Commerce" newspaper, then under the management of M. Charles de Lesseps. He wrote chiefly on political matters during the five years he was on the staff of the newspaper, but found time to write a three-volume novel.

When the revolution of 1848 broke out Nadar was doing well as a journalist, but his sympathy with the Poles led him to join the Polish Legion, and later on he got into serious political trouble and was imprisoned, once at Magdeborg and again at Eisleben.

When restored to liberty, Nadar returned to Paris and to journalism, but soon gave up the latter because of the severe restrictions imposed by the law of 1852, a law which deprived him of the liberty which men of his stamp require for wielding the pen. Nadar then founded a photographic studio, which soon became, and for almost a generation remained, a most fashionable establishment. Says one French book written during Nadar's lifetime, "He was the first to apply the electric-light to the art of photography, and published some very curious views of underground Paris—sewers, catacombs, etc.—taken by this new process."

Nadar had for many years been interested in ballooning, and at one time ballooning led him to neglect the big photographic business he had built up, and to spend about 200,000 francs on the building of an aerostatic monster which he christened "The Giant," in which he had many exciting adventures, and from which he took many photographs. "The Giant" ascended first of all from the Champ de Mars, Paris, on August 4, 1863, and later on Nadar brought the balloon to the Crystal Palace, where it attracted a considerable amount of attention. Although a keen balloonist, Nadar was convinced that a heavier-than-the-air machine would travel with greater certainty through the air—if some means of keeping it in the air could be found. He appears to have made no experiments in this direction, though his book contains many ingenious arguments.—Yours faithfully,

L. Tennant Woods.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent *International Coupon, from readers abroad.*

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

M. H.—The prohibition in regard to outdoor photography has now been withdrawn.

E. N.—The spots are evidently due to the presence of iron in the washing water. We think if you tie a piece of flannel over the tap which feeds the washer you will prevent their appearance.

W. L.—We cannot think of any cause which would account for the change in the dyes other than those arising from the dyes themselves. Commercial varieties of the latter vary a good deal, and we think you might perhaps find a solution of your difficulty in making use of the specially prepared and selected dyes for tinting supplied by Mr. A. V. Godbold, 98, St. Asaph Road, Brockley, S.E.

O. W.—There is no really satisfactory method of toning ferro-prussiate prints. We experimented very fully some years ago, and our experience, which is that of other workers, was that the results of toning are very defective as regards colour of the image and purity of the high-lights. The only book now in print on the ferro-prussiate process is "Photographic Reproduction Processes," by Duchochois (Hampton's, 2s. 6d.).

E. H.—The usual plan among trade workers is to make prints of the separate heads on very thin paper, cut them out with scissors, mount on a medium tint board, and touch up the edges as may be necessary with brush work, afterwards photographing on to a fresh negative. There are no firms which make a specialty of this work, although most of the larger trade enlarging firms, such as Messrs. Raines or Mr. S. H. Fry, are constantly undertaking it.

Developer Stop Bath.—Can you recommend a stop bath in which bromide prints can be left until development is complete? Kindly state procedure and number of changes before fixing.
Convenience.

About the best solution is one of citric acid, say 50 grains in a pint of water. This will arrest development, although personally we much prefer to transfer the prints to running water rather than employ any acid stop bath.

W. N.—Without defacing the prints by chemical tests, we should say that it is a sulphide-toned bromide or gaslight. Possibly by the hypo-alum form of sulphide toning. With most papers it is not easy to get this purplish tone by the ordinary ferricyanide bromide bleach, followed by sulphide, although the bleaching compound sold in tabloid form by Messrs. Burroughs Wellcome yields tones largely inclined to purplish, but we expect this form of chemical would be too costly for your commercial use.

F. N.—We do not think you will succeed in getting rid of fog in the studio by any method of ventilation. We take it your trouble is a certain mistiness in the photographs due to the fog in the studio. The remedy for this is to screen the area between the sitter and the lens as completely as possible from the light of the half-watt lamps. You might also find it of advantage to reduce the area by using a lens of shorter focal-length, although, apparently, from the size of your studio, you cannot do very much in this direction without sacrificing good perspective.

S. E.—If it is a matter of making the joints watertight, the best material to be used for caulking is marine glue, which, if not obtainable locally through a drysalter, can be got from a firm such as Penrose and Co., 109, Farringdon Road, E.C. But if the joints are not tightly made, there will be difficulty in getting the tank watertight, no matter how it may be caulked. For rendering the surface of the wood less permeable to solutions, about the best method is to apply melted paraffin wax, brushing it on as hot as can be done and then again melting it in contact with the wood with a hot iron.

J. G.—If you could show us the postcards which you wish to combine, or, if you cannot do that, tell us what is the description of your subjects, we may be able to help you. Broadly, there are two methods, namely, that of cutting out the subjects, mounting on a medium tint card, working up the composite print, and making a copy negative from which an enlargement is made. The other plan consists in masking the enlargement paper on the easel when separately enlarging from the three negatives. But without knowing what are the subjects of your originals it is very difficult to advise you as to which is the better plan.

F. B. B.—The flatness of gradation may be in part due to too hasty development of the prints, but we should say from the results that if the negatives are of decent vigour this is not enough to account for the defect. Without having seen the black-and-white prints it is difficult to advise you, but we should say the remedy consists in developing prints to greater vigour by shortening the exposure and by developing almost until prints will get no denser however long they remain in the developer. By working under these conditions the ordinary sulphide-toning process can hardly fail in giving sepias of sufficient vigour.

F. W. B.—The question you ask can best be solved by experiment, as you alone can be the judge as to whether the results are satisfactory. We certainly think you will gain little by such a roundabout method. It is generally agreed that starting with a perfect negative, there is a loss of quality each time that the image is reproduced. If the final print is to be made upon a developing paper, it would be best to enlarge direct from the original negative. With an indifferent negative you can, of course, modify the contrasts by the method you propose. You would also gain if much working-up of the intermediate enlargement were necessary.

G. P.—1. We should prefer to immerse the paper when sizing as the solution is more likely to penetrate the surface more evenly. 2. The paper should be floated on the salting solution; if immersed it will probably require more silver when sensitising. If you can brush the salting solution on so that no streaks appear in the prints it will answer as well. 3. It is well to float the paper when sensitising for the same reason. The brushing method is only used when a small quantity of solution is used. 4. Potass. chloroplatinite, 4½ grains; water, 10 ounces; nitric acid, 2 to 3 drops. This gives a different colour from gold, but is probably no more permanent.

C. A. W.—1. Since neither of the plates mentioned has a standard or set rapidity it is impossible to answer this question. 2 and 3. Absolutely useless, as the exposures would be extremely long. With, say, 16 burners and the lens you mention you would get a fair exposure in about three to five seconds. 4. Certainly, else what is the value of H. and D. numbers? 5. Yes, if it has a sufficiently long focal length. 6. We cannot undertake to answer such a question. 7. So far as we know, no startling improvements of any kind are likely to be made in the near future. It is useless to try for greater speed unless depth of field can be obtained at the same time, and this is mathematically impossible.

B. E.—We believe the bleach commonly used is the iodine-cyanide reducer, that is to say, a mixture of iodine (dissolved in potassium iodide) and potassium cyanide. Proportions do not matter very much, and, in fact, cannot easily be given, as cyanide varies so very greatly in strength. Certainly a waterproof resist is used as a temporary protection of the image, though we do not know what is the composition of these stopping-out media. One which is fairly extensively used is supplied as "Deleto" by the Aerograph Company, 43, Holborn Viaduct, E.C.1, but we should think that many ordinary varnishes could be used, followed by application of the solvent for the subsequent dissolving away of the resin.

Focus of Studio Lens.—Since you announced that you had an article in preparation on the focal-length of lenses in portraiture, I have been looking forward to it, and have read with attention Mr. Charles' contribution on this subject. Although his article demonstrates in a clear and interesting way why a short-focus lens should not be used for portraiture, I cannot help thinking that the majority of your readers would have liked him to have stated what was the best focal-length of lens that should be used, and the best distances of lens from subject in cases of busts, half and full-length portraits. For instance, I have read that for busts, ten times the focal-length of lens distance is the nearest the lens should ever be to the sitter. If this be so, I rather fancy it is a rule mostly disregarded in the studios. Of course, we are often told that the longest length of focus that the length of the studio will permit is the one to use, but it would be more helpful to the working photographer to give him cases suitable for rooms of, say, 10, 15, 20, 25, 30, and 40 feet, under divisions. Bust, three-quarter and full length. Perhaps Mr. Charles or you yourselves will give us this information. Then, having portraits of proper perspective, we shall more easily recognise distortion, due to too short a distance between lens and sitter, if we work within these distances.—G. W.

You quite misapprehend the conditions for obtaining good perspective in portraiture. This is entirely due to the distance between lens and sitter and not to the focal-length of the lens. Photographs taken at the same distance will have exactly the same perspective, but the shorter the focal-length the smaller will be the image. As a rule, 16 inches has been found a suitable focal-length for general work, and we believe that most good-class portraitists use a lens of this size. This would call for about seven feet between lens and sitter for a medium-size cabinet head, which is the shortest distance we should consider allowable. For larger heads twenty-two to twenty-four inches is a good focal-length. Many photographers use lenses of as short a focal-length as 11 or 12 inches for cabinet heads, but we should not recommend such a practice. You can easily try the effect of a long-focus lens by using one-half of your ordinary whole-plate R.R. This is, of course, very slow (*f*/16), but will serve to show the perspective.

The British Journal of Photography.

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SUMMARY.

A very useful flash-light cabinet, in which the compound is ignited by the electric spark, contact being made by the opening of the shutter, is described and illustrated on page 547.

In a leading article we review the processes by which the average assistant obtains a knowledge of photography, and suggest a more scientific system of training. (P. 545.)

An interesting lecture on home portraiture was delivered by Mr. W. Foster Brigham at the Royal Photographic Society on Tuesday last; lighting and composition were among the points dealt with. (P. 548.)

The wholesale production of photographic postcards, dark background vignettes, lenses for the studio, and electric light are dealt with in "Answers to Correspondents." (P. 552.)

At a recent meeting of the Lancaster and District Master Photographers' Society various questions of interest were discussed. (P. 550.)

We much regret to announce the death of Mr. T. E. Freshwater. (P. 549.)

The pros and cons of placing an anti-halation coating between the sensitive film and its glass support, as practised by some Continental makers, and the more usual method of putting it on the back of the glass, are discussed on page 545.

An effective method of removing developer stains from the fingers without risk of injury to the skin is given on page 550.

A method of extra-sensitising commercial bromide paper, so that it may be used for negative work, using the new Sensitol green, red, and violet dyes, is described on page 550.

At the Croydon Camera Club last week, Dr. C. Atkin Swan gave a lantern lecture, including many useful technical details, on Alpine photography. (P. 549.)

In a letter on page 551, Mr. D. Charles refers to the difficulties of writing photographic articles when on active service in France.

"Colour Photography" Supplement.

A simple explanation of the principles involved in the production of colour photographs by the "additive" and "subtractive" methods is given on page 45.

A translation of a paper upon "Dyes in Colour Photography," by Dr. Seyewetz, dealing with light-filters, screen-plates, diazotype and bleach-out processes, appears on page 46.

Decennia Practica is devoted to the Lippmann or interference process and the various methods of reproducing and viewing such photographs so obtained. (P. 47.)

EX CATHEDRA.

Bichromate Printing. Mr. Starnes's paper at the Royal Photographic Society last week was a welcome if minor contribution to our knowledge of bichromate printing. Considering the great possibilities which still exist for printing processes in which the image is formed by a pigment, it is to be regretted that the subject receives so little experimental investigation. Beautiful as it is, the carbon process is bound always to be limited by its inherent handicap of transfer; yet processes in which the aim has been the direct development of a bichromated pigment-colloid film have never enjoyed more than a brief reputation, and by their failure to attract users on a wide scale have tended to discredit this form of pigment printing. Mr. Starnes's process, even if it is not susceptible of commercialisation in its present state—and we do not think it is—should help towards directing progress along this channel. Probably such progress will come from the individual experimenter: the commercial interests which have carbon printing in their charge have apparently been prompted in any research which they have undertaken by the desire to improve the process in detail; at any rate we have never heard of any attempts to change its character. In some respects Mr. Starnes's method has features in common with that of Mr. Nelson K. Cherrill (B.J. Almanac, 1910, p. 567) to which Mr. McIntosh referred, although Mr. Cherrill was at pains to preserve his sensitive coating strictly neutral, and Mr. Starnes to make his strongly acid.

* * *

Non-Halation Plates. Dr. Seyewetz in the paper on the employment of dyes in photography, which we published a week or two ago, referred to the use of a coloured coating between glass and emulsion as though that were the only, or, at any rate, the chief means of preventing halation. Yet so far as our knowledge goes the use of a backing on the rear surface of the glass is by far the more commonly used expedient amongst French photographers as it is amongst us. Still, it is a curious fact that British plate-makers have never favoured the plan of a light-absorbing coating immediately below the emulsion film, despite the obvious theoretical advantage which the method possesses. In justice to them it should be said that they have brought backings to a degree of perfection in point of convenience and efficiency insomuch that the practical results probably exceed those of a backing sandwiched between film and glass, whilst presenting the good feature of separating the emulsion from anything which could affect it. Nevertheless, there may be still a market for the sandwiched backing among those who have been led to prefer the foreign makes. The method is, of course, not limited to the use of dyes, since inorganic coloured substrata which can be removed by the alkali of the developer, the hypo of the fixing bath, or by some easily applied bath are susceptible of application. Among these compounds one which we recollect as having been patented for the purpose is ferricyanide of molybdenum prepared in a form which is rendered soluble by an alkaline carbonate.

* * *

Formulæ for Sale. It is necessary, it would seem, to refer again by way of warning to offers of formulæ for photographic processes which continue to mislead the unwary. It cannot be too emphatically stated that such formulæ are very rarely worth the money which is asked for them, and are most probably worth nothing at all for the reason that they contain no more than is commonly known through books or periodical publications on photography. Even when formulæ contain novel elements it requires to be shown that they are effective for the purpose described, in other words, the seller should be required to disprove the contention that the formula would be no better or worse without them. It is because we have known of considerable sums of money having been repeatedly paid for the same formula for an emulsion that we repeat a warning which cannot be too seriously regarded. In all such cases, where any sum from £50 upwards is asked, the proper course for the buyer before parting with a penny of his money is to propose confidential investigation of the formula by an independent expert, who should say whether it possessed any novelty distinguishing it from others published, and, in the event of its being so, whether the novel ingredient actually served any useful purpose. If a secret process is genuine, the vendor cannot object to such obvious measures of precaution being taken. If this course were invariably taken there would be few disappointments at the purchase of formulæ which have no commercial value.

COMPETENT ASSISTANTS.

It seems as if master photographers are at last becoming alive to the fact that competent assistants cannot be obtained without some proper system of training or teaching, and that in most parts of the country there are no facilities for such training. In the past the rate of remuneration for the great bulk of photographic workers has been so wretchedly low that it has not attracted the class of young people who were inclined to spend their spare time in study, and, therefore, the industry has had to depend upon those who drifted into it, and by watching what went on around them managed to fill vacancies as they occurred, often leaving these for some other occupation which offered a better return for their labour. We remember our surprise, when visiting a large factory, at finding an old acquaintance, who had formerly been assistant operator to one of the best-known photographers in England, driving a stationary engine. Upon asking why he had abandoned photography we were told that the job was worth ten shillings per week more than Mr. Blank had ever paid him, and that the work was less exacting.

It was formerly the custom for photographers of good standing to take "articled pupils," with whom they received a substantial premium, for a period of one or two years, but very often parents and guardians had to complain that the youth was put to routine work, and received little real instruction. In several cases which have come under our notice premiums have had to be returned to avoid legal proceedings. Now the custom seems to be to take a youth as a sort of errand boy or as help to the printer, and to let him pick up such scraps of knowledge as fall in his way. His superiors had learned their business in the same fragmentary way, and working by rule of thumb could not impart efficient instruction, even were they disposed to do so, which they seldom were—seeing in the lad a possible supplanter as soon as he knew as much as they did.

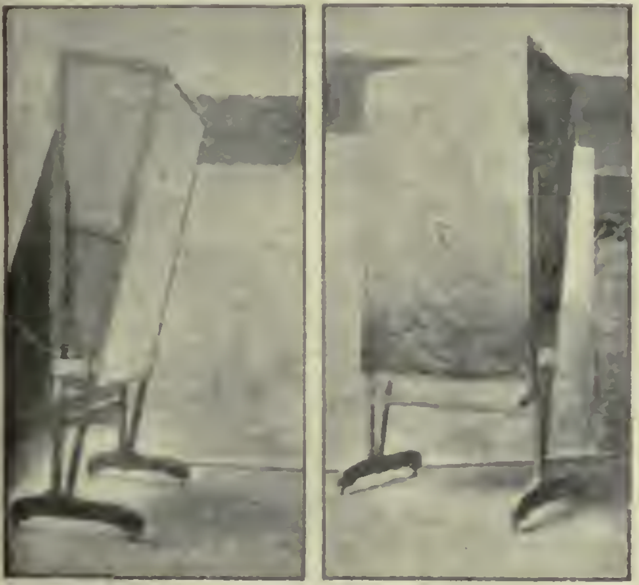
Now this has all got to be changed. In the great wave of reconstruction which is sweeping through the country photographers must play their part; they must help in the work of making the nation one great body of efficient workers, and those who are unable to take part in the training of the rising generation must do all in their power to facilitate the work of those who can. It should be a point of honour in the photographic as in the medical profession for every skilled practitioner to impart his knowledge to those who are to follow him, and to cooperate in such schemes of local technical education as may be formulated. The Edinburgh photographers have foreshadowed such a scheme, and once the way is shown other districts will doubtless follow. The Ministry of Pensions is doing its best to train men who are incapacitated from following their former laborious occupations in various lighter trades, and photography is one of them. A certain number are already placed in situations and are giving satisfaction, as they acquire by workshop practice that dexterity by which they can utilise the theoretical and practical knowledge they have obtained in the classroom, and we are sure that photographers will gladly avail themselves of their services. One point we would draw special attention to, it is that the Ministry will not instruct a man in any trade in which he cannot earn a living wage, the minimum being two guineas weekly. There should be no difficulty on this score, for in other trades employers have learned that the man who will work for low wages is a bad investment. An operator who uses plates lavishly to obtain satisfactory results, or a printer who wastes paper, is not only a source of actual loss on that account, but he delays delivery and spoils the reputation of his firm by turning out work which is only just good enough to pass. In the past many photographers have been averse from employing youths who have been trained in Polytechnics and other technical schools on the ground that the theoretical knowledge so obtained was of no value in everyday work, but this is a mistaken idea; the novice who understands why certain things are done is much more likely to learn to do them skilfully than if he merely picked up the manipulative part from watching another man who has perhaps totally erroneous ideas on the subject, while he will certainly have more pride and pleasure in his work when he has an intelligent grasp of his subject. At one great concern in America all the assistants are put through a course of instruction which would enable them to pass the City and Guilds Examinations here without difficulty, and we should be glad to see the same thing done by our great manufacturers here. On the other side highly trained demonstrators are placed at the service of professional photographers so that they may learn how to produce the best results from the materials supplied to them, but here such demonstrators are few, and hitherto their energies have largely been expended upon lecturing to amateur societies. It would be a good beginning if a short course of instruction in both the technical and artistic sides of photographic work could be given at the annual Congress of the P.P.A., which we trust will soon be resuscitated, admitting assistants as well as employers. Very much useful work has already been done in this way, but much more has to be done, the great need being that some system should be established rather than that sporadic lectures and demonstrations be given. From the reports of the various American Congresses we learn that the best operators show how they obtain their effects, while others demonstrate the working of plates, papers, and developers.

One great failing with many photographers of the old school is secretiveness. If one of those fancies that he has discovered or has imparted to him any method of working which he thinks is not generally known he will hug it to himself, and while receiving all the benefits of other people's experience grudge his one piece of knowledge, which we may remark is usually something which has been published times without number, but as such people rarely read photographic literature they imagine it to be their exclusive property. We remember some years ago being presented with the formula for the mercuric iodide intensifier under a strict promise of secrecy. The chagrin of the donor on having it shown to him in the Almanac was ludicrous; for years he had mixed it himself so that his assistants should not learn the formula. Such practices do not tend to produce good assistants, who in their turn will strive to utilise for the employer's benefit any useful information they may glean. Let us say again to master photographers the times call for the working out of a scheme of practical instruction that will produce competent assistants, who will do yeoman's service while their employers look after the artistic and financial side of the concern.

A FLASH-CABINET FOR STUDIO PORTRAITURE.

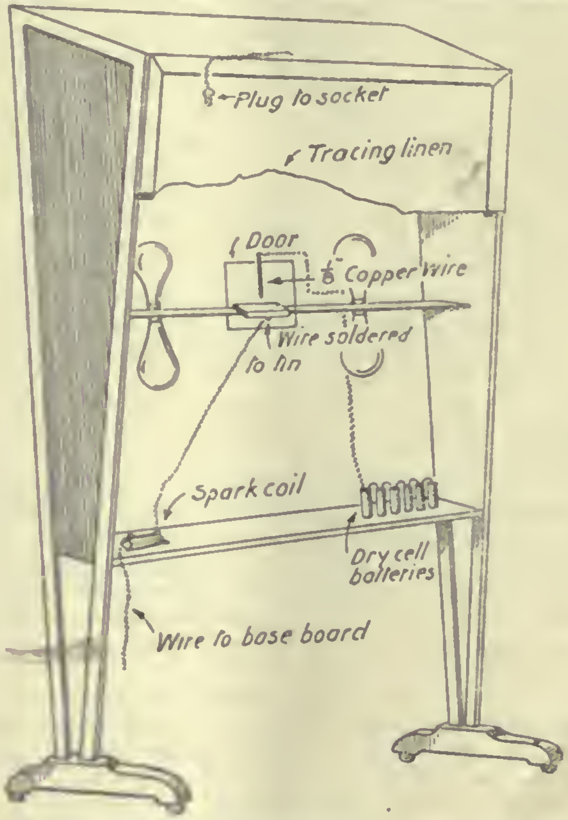
[We have alluded on several occasions to the infrequency with which in this country really adequate means are taken for the employment of flash powder as the source of light in a portrait studio. In France such installations are fairly common; in America flash cabinets of one pattern or another are familiar articles of commerce. Inasmuch as a device of this kind is the best solution of the artificial-light problem for photographers not having electric supply, it may be of service to reprint a description of a home-made flash cabinet which our contemporary, "Abel's Photographic Weekly" publishes in a recent issue.—Eds. "B. J."]

For the benefit of those readers who may desire to construct a flash-cabinet I can hardly do better than describe in detail the one I use. The two illustrations herewith show the construction quite clearly. The framework is of 2 x 3 strips, so put together as to give a slightly inclined front about four feet wide and about five deep. As shown, the slant of this front is about the same as that of the ordinary single-slant skylight shown behind and to the left. The feet or supports are sawn out of three-inch boards, two feet long, and both are supplied with casters, so that the cabinet can be moved about to get the desired lighting without disturbing the sitter. The front is neatly covered with tracing cloth, as this gives an even diffusion of the light. The ends and back are covered with white oilcloth, glazed side in, while the top is left open to permit the small amount of smoke to escape.



End and back view of Cabinet.

The tracing-cloth front is put on with a small wooden strip all round the edge, the oilcloth at the ends is tacked on from the inside, while that at the back is put on from the outside, the bottom and part of one side of this last being left unfastened, so that easy access to the inside is obtained in case the batteries or the wiring demand attention. In this back covering, a little below the centre, an opening is cut about six inches square, and through this we place the powder on the flash pan. The small strip nailed on the side of the cabinet forms a pocket that contains my box of flash powder, always handy and out of the danger zone.



Cabinet in detail.

Just inside the opening shown in the back of the cabinet is the powder pan, made of a piece of tin with its edges turned up. Inside the cabinet there is a cross-piece of the framework at this point, and this supports the pan. To the under side of the latter is soldered a small copper wire that passes to a spark coil resting on the bottom of the cabinet, and then on to the wire along the baseboard. Another like wire is so arranged that its end forms a point just above the centre of this pan, this wire being connected up with six dry-cell batteries, wired in series, in the bottom of the cabinet. The sketch herewith should make the whole matter quite clear.

Should one wish, it is not at all difficult to arrange this firing pan to slide up and down on an upright or perpendicular piece of wood near the centre of the cabinet back; and, if more movement is required, this upright strip can easily be so arranged as to slide from side to side between two grooved pieces, one in the top and the other in the bottom of the cabinet. This last, however, is hardly necessary, as the casters on which the cabinet rests permit easy shifting of the light. I mention such an arrangement because it is one used in my large permanent flash-cabinet that has a front some ten feet wide, and takes the place of a skylight. This was built, not because I thought so large a light necessary, but because I had the space and wanted something that looked as if it was a part of the room instead of something within it. The one I have tried to describe answers every purpose and costs only a small amount for material and a little labour in putting it together.

The wire from the spark coil in the cabinet is best run along the base-board of the studio wall, as its appearance is better than that of so much loose wiring lying promiscuously on the floor to endanger the feet. This wire should extend to two sockets, one fairly close to the usual cabinet position for bust pictures, and the other far enough away for groups or full-length figures. To reach from these base-board sockets, whichever is being used, there is a cord to an ordinary cut-off switch on the back of the camera stand. This switch prevents any accidental firing of the flash when loading the flash pan or opening shutter in focussing before exposure. The wire from this switch passes on under the top of the camera stand to the lens board, and through that to some such part of the shutter that when opened, by pressing the bulb, the blades will connect or form contact with a continuation of the wire, placed at the right distance, completing the circuit and firing the flash powder in the cabinet. That is, if the safety switch on the back of the camera is closed. This arrangement inside the lens board will depend upon the style of the shutter used; and, if one is in doubt as to the best way of doing this, he need only ask the advice of some electrician, explaining that he wishes the opening of the shutter to close the circuit. I use a Silent shutter, and run one wire to the support for the blades, while the end of the other wire is so fixed as to be touched by the blades as they are fully opened.

The cabinet also contains four 250-watt lamps, arranged on two cross-pieces, made of the same material as the framework across the back, to which they are attached. These are wired together and provided with an ordinary flexible cord that can be connected to a socket in the ceiling of the room. They serve a most useful purpose in enabling one to judge of the lighting that the flash will produce, as well as furnishing light by which the focussing can be done.

As stated before, the supply of powder is kept on a little shelf at the end of the cabinet. With it is a little wooden paddle about one inch wide that I use to measure out the powder. Experience soon teaches one just how much powder is required for different distances; and once this is learned one has no trouble in securing absolutely correct exposure every time. The ease and convenience of the flash should recommend it to a great many photographers, and if they would but give it a trial I am quite sure not a few of them would follow my plan and use it exclusively.

R. C. Ward.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Saturday, December 7.

Ilford Photographic Society. Annual Exhibition closes.
Rodley and District Photographic Society. Social evening.

Sunday, December 8.

United Stereoscopic Society. "The Lake District." J. A. Hodges.

Monday, December 9.

Bradford Photographic Society. The Amateur Photographer and Photography Prize Slides. Also Members' Slide Night.
Dewsbury Photographic Society. "Print Criticism" and Members' Lantern Evening. Messrs. Gondill, Dawson, and Parkinson.
City of London and Cripplegate Photographic Society. "Portraiture." R. Chalmers.

Tuesday, December 10.

Royal Photographic Society. "Studies on Photographic Sensitisers." Part I. Prof. W. J. Pope, C.B.E., D.Sc., and Dr. Mills.
Manchester Amateur Photographic Society. Lantern Lecture: Edinburgh and District. T. Cheyne.
Dennistoun Amateur Photographic Association. Visit to South Glasgow C.C.

Wednesday, December 11.

Croydon Camera Club. "Illumination and Illuminants." H. Guy Johnson.
Dennistoun Amateur Photographic Association. Lecturettes: "Engraving." D. McMillan. "Photographic Chemistry." J. Harvey.

Thursday, December 12.

Brighouse Photographic Society. "Humours of Country Life." W. Hardcastle.
Hammersmith Hampshire House Photographic Society. "Some Cornish Pictures." A. J. Linford.
Rodley and District Photographic Society. Pictures for the Y.P.U. Portfolio and Lantern Slides for the Y.P.U. set.
Hull Photographic Society. "Plain Salted Paper." J. T. Dyson.

Friday, December 13.

Dennistoun Amateur Photographic Association. "Intensification and Reduction." R. Wallace.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, December 3, Mr. A. H. Lisett in the chair.

Mr. W. Foster Brigham delivered a lecture on "Home Portraiture," illustrating his remarks by a large number of recent photographs, some made in the one-windowed room of a boarding-house and the others in an aeroplane packing case into which a couple of windows had been knocked. Mr. Brigham dealt first with the question of the background, and said that while the choice of a plain background was a means of going round a difficulty it limited the photographer's powers in the way of introducing balancing lines of advantage to the composition. He commended the indoor portrait on the ground, among others, of the naturalness of the lighting. However real the background and furniture used in a studio might be, the altogether different type of illumination compared with that in an ordinary room produced an artificial effect. In portraits made at the sitter's home, on the other hand, the lighting effects—and they could be of various kinds—corresponded with the appearance of people as they were ordinarily met with. It was not necessary to eschew a flat front lighting. Mr. Brigham showed a number of portraits made with this type of lighting in which a sufficient roundness of the rendering of the features was obtained. There was a great difference between a portrait of this kind and the somewhat unnaturally brilliant one obtained in a studio, but the former, he thought, corresponded more nearly with a faithful likeness.

A large part of the lecturer's discourse was devoted to composition in portraiture, and chiefly to the importance of supporting the lines formed in posing the figure by others in an opposite direction. A good instance of this was the portrait of an officer, in which, by thrusting back the elbow, the arm formed a line which supported the general leaning pose of the sitter. Other examples were, perhaps, less convincing. Possibly it is difficult to recognise at a first glance that a pair of weak horizontal lines in the pattern of the background were pictorially a support for an uncorseted and almost unclothed female figure, apparently in a crisis of physical collapse. But on such a theme as this Mr. Brigham, like anybody else, was under the disability of dealing with things which are largely matters of opinion, and perhaps he was tempted to press doctrines of composition into places where they did not easily fit. One excellent hint related to the posing of a portrait to fit the space of an oval. Mr. Brigham pointed out that in such a pose there should be at least one predominant line which corresponded with the curve of the oval. He instanced this in a portrait by an American photographer and in the well-known circular picture, "The Last of England," by Ford Madox-Browne, containing a number of lines roughly concentric with the boundary of the picture.

On the proposition of the Chairman, a most hearty vote of thanks was accorded to the lecturer by acclamation.

CROYDON CAMERA CLUB.

After an absence of two years the ever-welcome Dr. C. Atkin Swan reappeared last week in a scenic play, "In the Alps with a Hand-Camera." As a matter of fact, in the case of this popular visitor, who invariably takes the leading part, the actual plot is of no importance, so much so that if a fancy-free secretary had billed him to appear in a piece entitled, say, "In a Four-poster Bed with a Lively Flea," an equally large audience would have assembled confident of a first-rate dramatic entertainment on "legitimate" lines.

The lanternist, Corporal Blackburn, filled the rôle of principal villain, and when brought to book from time to time by six-foot something simulating righteous wrath, his nonchalant air and untroubled smile materially assisted towards a vivid representation of a callous scoundrel. He was ably supported by Mr. H. C. Newcombe, assisting. The lanternist being impossible to crush, as the play proceeds the doctor selects from his audience minor reprobates, or at least this has been his practice at Croydon, which occasionally introduces unexpected situations, when rectitude, as personated by him with fair success, may receive a grievous setback. And this despite a wonderful sonority and command of language, combined with a well-assumed terribleness of aspect calculated to make the knees shake. Should the R.P.S. at any time exhibit Bolshevist tendencies its president undoubtedly is the right man to nip the worm in the bud, to employ one of many exquisite metaphors evolved by a leading pictorialist of the club. On the present occasion the virtue in the excellent slides was so patent that little of its opposite was required for accentuation, and only one "bonny blue-eyed boy" was conscripted from the audience.

In his opening remarks Dr. Swan said how delighted be was to be home again at Croydon, and see the cheery faces around him and the hospitable bottles sitting up nicely in a corner. Most of his best slides had been smashed (how often this is the case). He trusted all would ask questions as he went along, and with this in view he had already subsidised the office boy with half a crown and promise of free refreshment. Finally, the doctor burst into poetry with an incorrect version of "Mary had a little lamb," upon which a kindly member switched off the lights.

The main lesson to be learnt from a capital lecture, with the lecturer in the best of form, was the advantage of panchromatic plates and filters for depicting Alpine scenery. Dr. Swan employs Wratten's with a K 2 filter, though occasionally the G filter is utilised, especially if any mist exists requiring penetration. Compared with "ordinary" brands, the colour-sensitive plate showed a far finer gradation in the snow, with true tonality between it and the sky. The inclusion of clouds, when present, also greatly added to the beauty of many slides. "Non-filter" plates used without a filter, as might be expected, in no ways rivalled the screened panchromatic.

Many years ago a member of the club showed pictures of swirling clouds and snow peaks on ordinary plates, which he said had received exposures of 1/100th second (reputed) at *f*/64, and a general impression exists that as you ascend exposures are considerably reduced. Dr. Swan has not found this to be appreciably the case, at 10,000 feet a typical exposure on a Wratten panchromatic behind a K 2 filter being 1/16th sec. at *f*/8. With subjects of extreme contrasts he exposes fully and develops with an extremely weak developer of the "Azol" class (1 in 100), when development may take upwards of an hour. Although he did not recommend this practice for normal subjects, by developing right to the back of the film the latitude imparted by the thickness and opacity of the film is utilised to the fullest, and the maximum amount of detail in the shadows secured without undue density in the high-lights.

Reverting to the slides shown respectively from screened panchromatics and ordinary plates, it may be remarked that with the former the shadows did show a slight lack of detail, which, however, gave a natural appearance as the blinding glare would have prevented their being seen. With the latter, shadow detail was more apparent, but the rendering of snow and distance was hopelessly inferior, except in cases when exposures on snow scenes were made in sunshine with direct front lighting. "Hydra" plates showed up very presentably indeed in some examples. With these plates when exposures are doubtful the lecturer starts development in a developer containing as many minims of ten-per-cent. bromide as grains of reducer, transferring the plate to an active unbromided developer in the case of normal exposure, or under-exposure. In some cases he waggles the plate backwards and forwards from dish to dish. He spoke very highly of the Watkins horizontal developing tank, but strongly recommended eight grooves in place of the twelve usually supplied.

Two cameras are carried on his trips abroad, one being a "Sibyl" strapped on his back. In the case of awkward ascents the camera is left at the last halting place, and at the next stop pulled up a hundred feet or so by a fine line attached to climber and camera. Sounds pleasant for the camera. Bumptity bump! On less agile occasions the "Una" is employed. He largely uses variable foci telephoto lenses, and in addition to picture making utilises them for determining the practicability of contemplated ascents by routes enough to make the average man's hair stand on end if sufficient is available for the purpose. It must be a sad trial for the president of the R.P.S. to enter through its portals in mundane fashion when stack pipes and roof offer an alluring alternative route. The wonder is he is still alive, and very much alive. For the majority of work on the Alps a lens of 8-inch focus on a quarter-plate camera, he said, will be found the most serviceable.

An animated but short discussion followed the lecture, which was accorded a hearty vote of thanks with much acclamation. During the evening Dr. Swan gave a hearty invitation to members to hear his forthcoming presidential address at the R.P.S., and said they might freely criticise at its conclusion. If this permission be acted upon in the correct Croydon manner it will be interesting to see how Mr. McIntosh will apply himself to the honourable office of chucker-out.

City of London and Cripplegate Photographic Society.—At the meeting held last week, Mr. Bridgen gave "A Chat on Pictorial Photography," and at the same time showed the "One-Man Portfolio" that he has presented to the affiliated societies for circulation. In explanation of his prints, Mr. Bridgen said that all of his cloud effects were taken on the same plate as the landscape. In exposing he always gave the landscape a little more exposure than the sky, by shading the sky portion with the lens cap. He carefully arranged his landscape on the screen, and then waited patiently for the clouds to get in the position suitable for the subject.

* * *

Death of Mr. T. E. Freshwater.—It is with much regret that we hear of the death, on November 22 last, of Mr. T. E. Freshwater, for many years a leading and congenial figure in London photographic circles. Mr. Freshwater was connected for the greater part of his life with the optical lantern firm of Messrs. Newton and Co. He was a great microscopist and a frequent lecturer on microscopical subjects at the Royal Photographic Society and the Quekett Club. For the last two or three years he had been living in retirement at Woodside Park.

Messrs. Raines and Co., of Ealing, in a notice which will be distributed throughout the world in the "B.J. Almanac," quote some figures which show the very great part played by photography in propagandist work during the war. Messrs. Raines have been heavily engaged in this work for the Government, with the result that their output has been three times that in 1914, and their staff has increased from 86 to 150. During the period of the war they have made the photographs solely for the twelve large exhibitions for the British Government, in addition to four for the Canadian Government, two for Australia, and one for New Zealand. The production of single prints for propaganda has reached a figure of 15,000 a week. Messrs. Raines hope that as soon as the whole of the works can be devoted again to the work of their private customers, that these latter will benefit by the improvements in organisation which the great volume of war work has demanded.

Commercial & Legal Intelligence.

In the Matter of a deed of assignment made for the benefit of creditors by Ernest Charles Morgan, photographic printer, Kewfoot Road, Richmond, Surrey, creditors are required to send in particulars of their claims, and assent to the deed of assignment, on or before December 19. The trustee is Mr. S. J. Hewlett, 3, Davies Street, Berkeley Square, W.1.

A Second and Final Dividend of 3s. 7d. in the £ has been declared in the failure of Frank Scott Russell (trading as Scott Russell and Co.), pictorial postcard dealer, 3, Highland Grove, Worksop, Notts, and formerly of Birmingham, Scarborough, and Sheffield. The dividend is payable at the Official Receiver's offices, Ruskin Chambers, 191, Corporation Street, Birmingham.

NEW COMPANIES.

Madeline Miles, Ltd.—This private company was registered on November 27, with a capital of £500 in £1 shares. Objects: to carry on the business of artists, photographers, picture dealers, frame makers, chemists, etc. The subscribers (each with one share), M. M. Miles, 8, Winchester Road, Ilford, photographic artist; J. W. King, Cranbrook, Cranbrook Road, Ilford, art dealer; and V. L. Wyrall, 150B, High Street, Bromley, Kent, photographer. Registered Office 45, Cranbrook Road, Ilford.

News and Notes.

Ilford, Limited.—Dividend of 6 per cent. on the ordinary share capital for the year ended October 31, the same as a year ago.

Death of Mr. H. J. Whitlock.—A veteran in photography, Mr. H. J. Whitlock, of Birmingham, passed away on Monday last. Mr. Whitlock was in his eighty-fifth year.

Royal Photographic Society.—The lecturers for next week will be Professor W. J. Pope and Dr. Mills on "Studies in Photographic Sensitisers." At the request of the lecturers the time of meeting has been postponed until 7.30.

Preventing Developer Finger Stains.—A correspondent of "Abel's Weekly" writes :—I wish to recommend the following: Just after developing before drying the hands, rinse hands in a solution of permanganate of potash, made by dissolving one-half oz. permanganate of potash in 16 oz. of water. After rubbing this solution well into the hands and over the finger nails, rinse in clean water and immerse hands in a solution made up of the following: Water, 8 oz.; sulphite of soda, 1 oz.; to which, after dissolving sulphite of soda, add 1 oz. of acetic acid, No. 8—28 per cent., or a smaller proportion of a higher per cent. of acetic acid—the more acid used the quicker the permanganate is removed and the pyro stains, etc. Rub the sulphite and acetic acid solution over the hands until stain is entirely removed. Photographers will find this remedy will keep their hands clean, if used accordingly, after a few applications. I have used it and know of others who have used this for several years without injury to the hands.

Extra-Sensitising Bromide Paper.—A recent lecture before the Manchester Amateur Photographic Society by Mr. F. J. Stoakley is the subject of an abstract containing details in the extra-sensitising of bromide paper for use in the making of paper negatives. The details are as follows :—

Bromide paper: Wellington Carbon Smooth and Paget Prize were found to yield practically grainless negatives.

Sensitise by bathing for one minute in one of following baths, drain and dry on inclined glass plate over night—all in darkness, keep sensitised paper under slight pressure in light-proof box.

(*a*) Sensitol green : Stock solution 1½ grains dissolved in 3½ fl. ozs. spirits of wine, working solution 25 minims stock solution, water 10 ozs.

Very suitable for landscape work—a deep ruby light may be used with intelligent care when developing.

(*b*) Sensitol red : Stock solution 1½ grains dissolved in 3½ ozs. spirits of wine, working solution 25 minims stock solution, water 10 ozs.

Suitable for interiors with dark woodwork, furniture, etc. No ordinary dark-room light is "safe" for this sensitiser.

N.B.—A mixed bath of 12 m. each green and red stock solutions in 10 ozs. water gives a paper sensitive to all colours.

(*c*) Sensitol violet : Stock solution 1/7th grain sensitol violet dissolved in 3½ ozs. spirits of wine.

Working solution : Water, 10 ozs.; spirits of wine, 4 ozs.; stock solution, 2 ozs.

Sensitises to all colours—no light may be used in development.

Notes (1) Water must be free from carbonic acid.

(2) Stock solutions keep indefinitely in the dark, as also does violet working solution.

Exposure : Reckon speed of sensitised papers about 125 H. and D., or equal to a "medium" speed plate.

Development : Any non-staining developer—M.Q., amidol, etc., may be used.

Society of Master Photographers (Lancashire and District).—A general meeting of the above was held at the George Hotel, Preston, on Tuesday, November 26, Mr. F. Kenworthy presiding in the absence of Mr. Kay through illness. Minutes of the previous meeting held at Manchester, October 30, were read and confirmed.

A vote of sympathy to Mr. Kay was extended and wishing him a speedy recovery.

Notice of motion given at last meeting to increase the number of the committee from nine to fifteen was then put forward and carried.

The following gentlemen were nominated and added to the committee :—

A. Beckett, Preston; W. H. Hnish, Blackburn; C. Howell, Blackpool; W. G. Frisby, Stockport; Ash Martin, Birkenhead; J. W. Stott, Bury.

Charges for electricity : The different rates charged in the various towns caused a lengthy discussion, and it was the general opinion that photographic studios should be placed on power rate.

Certificates for members : This suggestion was strongly advocated to counteract the cheap canvassing firms who go from house to house offering to give a free enlargement from any copy, and then insist on the householder purchasing a frame before they deliver the enlargement or original copy. An interesting account of how this system started was given by one of the members. The committee will take into consideration the advisability of issuing certificates to every member of the society.

Question of apprentices : This was deferred to a future meeting.

Charges for re-sittings : This item on the agenda provoked quite a spirited discussion, and a large number of members expressed their opinions on this subject. The general feeling was that with reference to re-sittings it was desirable to charge again for the number of plates used if the fault was not the operator's, but if the fault lay with the operator it was usual to take the sitting again without extra charge.

Exhibition of members' work : The members generally were strongly in favour of an exhibition being held at some central place, either in Manchester or Liverpool, and suggested that every member may submit three specimens, the size and style to be left entirely to the members' own discretion. It was also suggested that invitations be given to as many members as possible of the P.P.A. as can conveniently attend. The arrangements were left in the hands of the committee.

Co-operative Plate Works, Limited: The latest position regarding this new concern was then given to the members present.

The P.P.A. Council : As this was the last meeting of the year, it was decided to nominate two of the members for seats on the P.P.A. Council for next year, and that the names of Messrs. Kenworthy and Read be submitted to the Hon. Sec. of the P.P.A.

Printed copies of the members' names and addresses from the inauguration of the society, June 4, 1918, to November 12, 1918, were then handed round to those present. A hot-pot supper will be arranged after the February or March meeting.

A vote of thanks to the chairman concluded a most interesting meeting.

Correspondence.

. *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

. *We do not undertake responsibility for the opinions expressed by our correspondents.*

MATTERS OF PROFESSIONAL MOMENT.

To the Editors.

Gentlemen,—In your issue of November 22 my letter contains a misprint. "Mr. Medcalf and other types" should read "and other Tykes." Mr. Medcalf may object to being called a type, though evidently of the progressive get-together type that is wanted. The Tyke is a Yorkshireman who is a good fighter, a good sport, and who never lets go particularly of the brass. If he once gets the idea that union is strength, he will not let go of that either.

I was pleased to see in your issue of November 29 the letter from Mr. Marcus Adams that shows him not only alive, but all ready to kick and also to be friendly.

The letter from Mr. Horace Chapman, whose good wishes I reciprocate, proves that the soft answer does turn away wrath, a point that some dealers' clerks would do well to ponder.

By turning the other cheek Mr. Chapman not only saves his face, but uncovers mine. His amplification of the sergeants' mess analogy and of the value of exclusiveness are points well taken.

Apparently the proposed associates section is to be for all practical purposes a separate body, but the very idea of the P.P.A. being behind it would, I am afraid, cause the progressive assistant to view it with unfounded suspicion, whilst undoubtedly we should have trouble from the reactionaries in our own camp.

Let us hope for a congress in the spring, when these things can be discussed. Also let us hope that if there is a competitive exhibition the judging is not on such ridiculous lines that the president is ex-officio the medallist.—Faithfully yours,

Scarboro' and Bridlington. W. Foster Brigham.

FINDING OUTDOOR LIGHTING.

To the Editors.

Gentlemen,—Replying to Mr. Oliver Horton's letter in your issue of the 8th inst., which has only just reached me, the one and only argument he puts forward in favour of the method he proposes to use in preference to my directions is a phrase quoted from my previous reply to him. He says that to consider the sun to travel round the subject has the merit of being "based on actual facts that exist." If Mr. Horton wants to enter the lists with me on points of fact in physical geography or astronomy I fear I must admit my ignorance, but up to the date I left school the accepted theories were that this planet and all its contents moved round the sun.

However, that will not interfere with my critic using his adaptation, which is probably just as good as, but not better than, my original plan. May I point out that in any subject on which the sun shines any upright object casts a shadow in the form of a line, and that all these lines are parallel all over the subject, and are the visible continuations of the unseen rays of light? It is the desired light direction (or shadow direction, which is the same thing) which one would use the hand of one's watch to indicate in my method, and that is the essence of using a watch dial. Mr. Horton would apparently prefer to have the hand pointing to the sun. However, his word "if" commencing his second sentence would suggest that he is still not completely a convert to a scientific and accurate method of finding what was previously a matter largely of guess work.

The reproach contained in his use of the word "belated" I feel calls for a little defence. I do not know if Mr. Horton has been a soldier or not. If he has he will realise that literary work is not exactly easy under active service conditions, even those existing not quite in "the line," and when I say that part of that article was worked out during what is known as the "March stunt," and the remainder of it under the strained conditions following that great retreat, perhaps he will feel inclined to be less critical of a method on which he has not yet been able to make any real improvement. As to my additional explanation being "belated," Mr. Horton's query reached me one night just at "lights-out," and in defiance of regulations my reply was written by the flicker of a stub-end of candle, and was in the censor's hands next morning.

It calls for great enthusiasm to keep in touch with one's profession in the way I have been attempting to do, and it is a great encouragement to know, through criticism, that one's work is read with interest; and a little sarcasm *of the right sort* adds a spice to any argument, but really no one need call a soldier to account for lack of promptness. Even civilians, with all the resources of civilisation at their elbow or round the corner, are not always able to keep up a perfectly prompt and continuous supply of their various specialties.—Yours faithfully, D. Charles.

November 28, 1918.

THE REFLEX CAMERA.

To the Editors.

Gentlemen,—In your recent notice of the late Mr. Adams, of Charing Cross Road, the well-known photographic apparatus dealer, you made a reference to his interest, among other things, in the reflex principle in camera construction. I do not know to whom the reflex principle is generally ascribed, but it may interest your readers to know that a reflex camera made on the principle of to-day, with a mirror throwing the image from the one lens to the top of the camera and at the same time, or immediately after, making the exposure by a unified movement, was exhibited by myself at a work exhibition at the Polytechnic, Regent Street, in 1890—that is, twenty-eight years ago. On that camera, which was made in metal (from an old tin biscuit box, to be exact), was a notice to the effect that as a new principle was evolved, the undersigned (myself) would be pleased to explain it to anyone interested. Among the several London makers who asked me to do this was Mr. Adams, who at that time had a place of business in Aldersgate Street (opposite the Metropolitan Station), and who was much interested. His objection to the camera and the principle was that, as the camera was made of metal and necessarily would have to be to ensure accuracy, it would need a complete set of metal working tools laying down. I must confess I did not see his point, nor ever have. Several other well-known makers saw the camera, including Mr. Lancaster, of Birmingham, but I got no real encouragement. The fact is, I do not think anyone saw the advantage of the principle evolved. I had taken out a provisional patent in company with a friend in the country, who had made the instrument. Perhaps it would be strictly fairer to say we jointly invented the idea. In six months time, having received no encouragement whatsoever, we did not apply for a complete patent. It would not surprise me to know, or to have proof, that someone before myself and friend had thought out the idea, but these are the facts so far as we are concerned, and in so far as Mr. Adams was concerned. I will say, however, Mr. Adams gave me more promise than anyone else. Passing his shop the other day I looked in and reminded him of my connection with the reflex and my visit to him so many years ago. As much had passed since then, and both he and I had changed a bit, I don't think he really remembered me.

Inventors should, however, never be discouraged by folks who are apparent experts (this has no reference whatsoever to Mr. Adams) who state that their invention is impracticable. In my experience many men who are appealed to, while worthy men enough and skilled enough, have no perception at all, or prophetic instinct, if you like, and this lack of essential quality often passes a good thing entirely. As two glaring instances of this, I may say that one of the finest half-tone block engraving firms, with an admitted great scientist connected therewith, told me that three-colour half-tone blocks would never be of any use or ever be put to good service. That firm, needless to say, is no longer in existence. While one of the oldest camera makers in Great Britain also told me he would never make a film camera, for he did not believe film would ever be more than a child's toy. That concern still makes cameras, it is true—perhaps 500 a year—while the principle I extolled, and which he ridiculed, and the film which he said was only a child's toy, was responsible for making the little sum of $3\frac{1}{2}$ million pounds in one year (1916) for one firm alone.—Yours truly,

Frederic T. Corkett.

Research Laboratories, Butter Hill House, Dorking, Nov. 30.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent *International Coupon, from readers abroad.*

The full questions and answers will be printed only in the case of inquiries of generol interest.

Queries to be answered in the Friday's " Journal " must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

C. M.—We are sorry we know of nothing which will remove ink stains from a print without injury. In the case of a platinum print, you might try painting with a solution of bleaching powder, but that would not do for a bromide print, and, of course, it will remove any water-colour applied to a platinum print.

Blue.—It is difficult to account for the appearance of the enlargement except on the basis of imperfect bleaching of the print. Some of the papers now obtainable are difficult to bleach with the ordinary ferricyanide bromide mixture, and only bleach completely if you add some ammonia to the bleacher. We do not know whether the makers of the paper would have any other explanation than this. It should be worth while submitting the matter to them.

A. H.—Our advice to you, particularly in reference to your intention to use the telephoto for colour negatives, is to be content with such moderate magnification as you can get with the Ross Telecentric. By so doing you obtain a large working aperture (an important point in colour exposures, not only as regards time of exposure, but also equally as regards quality of the result) and also critical definition over the field. We think you would find that the occasions were few when you could make use of the greater magnifications with the lenses of the type you name.

O. E.—1. We believe that the only machines now to be obtained are those made by Mr. Ellis Graber, 16, Newton Road, Tunbridge Wells. Messrs. Wellington and Ward used to make large machines, but we do not know whether they continue to do so. 2. Always on glass. This should be prepared with ox-gall to ensure easy stripping. 3. Metol hydroquinone and an acid fixer are usually employed, and hypo-alum toning is most generally used. For pure sepias the ordinary sulphide process is, perbaps, the most certain, as some brands of paper will only tone to a purple brown with hypo-alum.

W. N.—1. We cannot see how you can divide the profits on the plan you mention. We should suggest that rent and all other expenses should be paid out of the takings as a first charge, then an agreed amount paid to each per hour worked, and that all remaining profits should be equally divided. 2. Three 1,000 c.p. half-watt lamps should be sufficient for your purpose, and these should be placed about five feet from the sitter in an L shape, one nearly in front of the sitter, one about three feet from this to one side, and the other about 18 inches or two feet further back to give you a side light, height about 7 to 8 feet from the floor.

Acton.—Your trouble is probably due to the fact that your lamps are too near to the sitter. If you will consider that with a lamp 6 ft. from the floor and, say, 4 ft. from the sitter's head that the upper part receives nearly three times as much light as the feet, you must expect the latter to be under-exposed. We should leave one lamp in the recess and bring the other more in front of the sitter, raising it to about 7½ ft. from the floor. This will improve the lighting, and with a small circular head-screen, covered with cheese-cloth to soften the top light, you should get evenly illuminated images. This will lengthen the exposure slightly, but not to any great extent.

E. E.—To obtain the effect you desire you must use a dark background, say dark green or dark red serge. The vignette is obtained by placing a black card cut into a suitable curve with serrated edges between the lens and the sitter; the upper part is not vignetted. It is impossible to give any definite distance for this, as much depends upon the focal length and aperture of the lens. For a head of the size you send you should use at least a 10-in. lens, and *f*/7.7 is rather a small aperture. You can modify the colour of the vignette by tilting the card so that it catches more or less light. The effect may also be obtained by putting a serrated card in the camera bellows about half-way between the lens and the plate, but this does not answer so well as putting it in front.

Studio Group Lens.—1. In a small branch studio, size 20 by 12 ft., what lens would you recommend as being most suitable for taking groups of from six to twenty persons postcard size and to be full length, landscape shape; and also groups of eight or ten persons, upright shape? The camera is only ½-plate size and is now fitted with a Ross Homocentric 8-in. lens. 2. For what other purpose would the lens you now recommend prove useful? 3. Name and price of book dealing in simple language with the different kinds of lenses and their uses.—Fusilier.

1. You would want a lens of about 5½ focus for the horizontal group portraits: for the upright you could run to about 9 ins.; in both cases reckoning by the height of the figures alone. 2. The 6 in. would form a medium wide angle for half-plate work. 3. "Photographic lenses" by Andrews and Beck, price 1s.

Nemo.—Collotype is by no means an easy process to work, as it depends so much on the weather conditions. Certainly it would be useless for you to think of picking it up from a book. You would need to have a course of practical instruction, say at the L.C.C. School of Photo-Engraving, Bolt Court, Fleet Street, E.C. Personally, we should think that unless your production is on a very large scale it would not pay you to do your own photo-mechanical work, but it would be better to put it out to a firm like Hood and Co., of Middlesbrough. The pictures in "The Sketch" are by the rotary process of photogravure; that is to say, photogravures printed from a rotating cylinder instead of from flat plates. This is a job only for the large printer, as the machine for it is a costly installation. Here again you can get cards printed by the process by firms such as Vandyck, Ltd., Bristol.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the " B. J." to order only, as the acceptance of "returns" by a publisher is now prohibited by the Government. It is therefore necessary in order to ensure the regular delivery of the " B. J." each week to place an order definitely with a dealer, newsagent or bookstall clerk, or to send a subscription to the publishers.

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The Summary of contents which usually occupies the lower half of this column will be found at the foot of the page overleaf and will continue to be placed there whilst its regular position is required for notices relating to the forthcoming "B.J. Almanac."

THE 1919 ALMANAC.

The comparatively sudden conclusion of the war has not been without its embarrassments for publishers. A recent notable instance was the Punch "Almanack," which must have been barely off the printing machines when the armistice was signed, and on publication showed itself so little conscious of the approaching end of warfare that it devoted its coloured cartoon to the possibility of our legislators having to don khaki, and forecast the end of the war, in Mr. Raven Hill's beautiful drawing, as taking place in 1919. Publishers of other annual works have naturally found themselves in like circumstances, and the publishers of our Almanac are no exception to the rule. While in our private lives we welcome already the removal of many restrictions, the things which dictate the policy of a publisher, namely, the shortage and price of paper and the restricted facilities of printing and binding, remain the same and are not likely to undergo any appreciable alleviation for some months to come. Hence the 1919 Almanac possesses a character which was impressed upon it during the final period of the war. At the time of writing it is passing through the press, and unless unforeseen obstacles present themselves it should be on sale at the end of January or the beginning of February. For the second time the price of the paper edition will be one shilling and sixpence, and that of the cloth-bound copy half-a-crown. Although there has been a further necessity to reduce somewhat the text portion, it will be found, we hope, that the book contains a great amount of valuable reading for photographers generally, together with a feature, of which we will say more another week, of special interest to the amateur photographer.

EX CATHEDRA.

Blue Half-Watts. We do not like to be at all sure, until we know more about it, of the advantage which it would appear is claimed in America for a new type of half-watt lamp the bulb of which is of blue glass. On the face of it, it seems unlikely that any benefit can result by cutting out part of the radiations from the filament. The suggestion seems to have something in common with that which has been made more than once in connection with daylight studios, namely, their glazing with blue glass in order to produce a more actinic illumination! But even if such a desirable end were reached by the new half-watt, we should still be obtaining a technical advantage in exchange for a commercial drawback. One very positively good feature of the half-watt lamps in comparison with an enclosed arc is the yellowish character of the illumination. The advantage may not be obvious at a first glance, but we have in mind one of the most successful portrait photographers making extensive use of artificial light to whom a yellowish illumination commended itself on the ground that the sitter, as seen by any friend accompanying her, looked very much better than in a bluish light. The effect might not have its counterpart in the finished portrait, but first impressions go a long way, and the lady having been assured that she looked charming at the time of the sitting would thereby be disposed in favour of the portraits when they finally reached her.

* * *

Dark-Slides. The evil effects of damp on the ordinary pattern of dark-slide are perhaps not always sufficiently recognised. There is no more certain way of warping the thin wood, from which the shutters of these slides are made, than by damp, followed by rapid drying, and directly this happens the slide ceases to be lightproof. It is not possible to suggest a home remedy for a slide with warped shutters; the only effective one is to return the slide to the makers for the fitting of entirely new shutters. Great care should be taken to prevent such slides from being stored in anything like a damp atmosphere. We came in contact recently with a worker who had left an ordinary double mahogany book-form slide for two or three days in a rather damp dark-room, with the result that when the slide was next required the draw-out shutters were almost too stiff to pull fully out. The slide in question was placed near a heating stove in order to get it dry quickly, with the result that the whole warped to such an extent that it was not possible to insert it in the camera with anything like a proper fit, and, in fact, the warping of the slide was so bad that light was admitted at the corners, completely spoiling the plates. This may be an extreme case; but it is given as a warning what to expect, especially with modern slides, which are probably made of mahogany less well seasoned than was the case with the apparatus of a score of years ago, which would stand a great deal of careless treatment without being any the worse. If a slide has got wet, or is suspected of being damp, it will be found a good plan to dry it very slowly in a fairly warm room, as no ill effect will then be likely to result. If, after being dried the shutters still run stiffly, the best way to ease them is by lubricating with a soft black lead pencil. Slides with vulcanite shutters give very little trouble in this respect, provided care is taken to avoid bending the shutters unduly. While on the subject a word may be added on the popular metal slides so much in use. These slides are generally very well made and will stand a lot of rough usage, but it is not wise to try them too far. The design leaves very little room for clearance between the draw-out shutter of the slide and the film of the plate, hence care must be taken not to bend the shutters, for, though this may not be sufficiently bad to prevent inserting the shutter into its groove, a very little will be enough to abrade or scratch the surface of the plate. We have more than once heard of trouble arising from this cause. These slides are also a danger when the dead black paint on the insides becomes worn off. There are photographers who assume that this is a matter of very little moment, but we are old-fashioned enough to believe in having everything inside the camera and slides as dead black as possible.

* * *

Exposure Meters. The modern photographer is rather apt to look with disfavour upon the exposure meter, as being the instrument of the amateur. There is, however, no reason why the photographer should not take advantage of it in some of the more difficult branches of his work, without feeling that such is in any way "infra dig." Take copying, for instance, or the photography of a piece of machinery in some engineering shop, where the light is, to say the least of it, tricky. Many hundreds of plates are doubtless wasted in the run of a year upon guesswork or experiments which the use of an exposure meter would have saved. We recently heard a photographer complain that he never got a correct exposure when relying on his meter, one of the standard patterns. Subsequent discussion elicited the fact that when he was ascertaining the "meter time" he neglected to observe a very necessary rule, *i.e.*, to hold the instrument facing the light, and *not* the light reflected from the subject. The fact of the matter often is that many operators do not pay enough attention to the instructions issued with the meter. When counting the "meter time" in seconds few operators trouble to employ a watch, preferring to do their counting in their own heads. This, again, is likely to cause error, since the conception of the period of time designated "a second" is very widely different in the minds of different people. Great care to ensure accuracy is certainly not essential, but a certain approximation is necessary if the test is to have any value at all. When working under bad conditions of lighting, when the meter is most likely to be used and is certainly most valuable, the operator may grudge the long time taken in order to make the light-test. Many users of the Watkins meters are not aware that the two exposures, the meter and camera, may be made at one and the same time. By selecting a suitable stop for the plate in use, which can be found on reference to a table in the Watkins booklet, the darkening of the paper to the tint indicates that the period of exposure has been reached, thus saving all calculation. Another point that many workers overlook is that the meter should always be exposed on the worst lighted part of the subject or its equivalent, for obvious reasons. Neglect of this has often resulted in the meter being blamed for giving an incorrect reading. We do not mean to imply that a skilled photographer will need to use a meter for every ordinary exposure that he makes. For this there is certainly no need, but when working under difficult lighting conditions, or undertaking new and strange subjects, even the most expert worker can have no better assistant.

* * *

Lens Mounts. There is one point to which British opticians might give attention when designing new anastigmats for after-the-war trade, and that is to provide each instrument with a deep hood. The shallow mounts in which some of our best anastigmats are sold are quite inadequate for one of their primary purposes, *i.e.*, that of cutting off the brilliant light falling upon the front surface of the glass. No matter how perfect the lens itself may be, such is fatal to the making of a clear, bright negative. We have only to fix a temporary shade to the lens to cut off this light in order to realise what a drawback a shallow hood really is. One of the best anastigmats that we have ever used shows this to a great degree. The front glass of the instrument is practically flush with the front of the lens mount, and when near windows or other strong illumination are at right angles to the camera there is a marked veil even upon the image as seen on the focussing screen. Obviously, good negatives cannot be expected under such circumstances unless the lens is hooded. In the case of another old-fashioned instrument

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SUMMARY.

In a contributed article Mr. W. E. Debenham puts the case for the use of a short-focus lens, when the occasion demands, in a convincing way. (P. 558.)

Business changes are always going on, so that we give a little practical advice to those who contemplate buying or starting a studio. (P. 555.)

Some practical suggestions on plate economy, based on the use of different sizes from those usually employed, are made in the report of the Sheffield Professional Photographers' Association. (P. 561.)

Across the Atlantic half-watt lamps with blue glass bulbs are finding a certain amount of favour. We point out certain disadvantages in connection with the use in a paragraph on page 554.

At a dinner given by the Edinburgh Society of Professional Photographers other matters besides viands were discussed. (P. 560.)

The future outlook for assistants, the production of all-British lenses, and chemical poisoning are the principal subjects of correspondence on pages 562-3.

A charge of alleged false pretences against a London photographer, resulting in an acquittal, is reported on page 561.

A note upon some precautions necessary to the successful use of exposure meters, particularly accuracy in counting seconds for tests in good light, and also placing the meter near the less illuminated parts of the subject, will be found on page 554.

Some useful dodges in everyday photographic practice will be found in the report of the Croydon Camera Club meeting. (P. 559.)

The first portion of the twenty-first Traill Taylor lecture, by Mr. W. F. Twyman on the use of the interferometer for testing optical systems is given on page 556.

The present damp weather is trying for any apparatus mainly constructed of wood. A note on the care of dark-slides appears on page 553.

In "Answers to Correspondents," lens matters, studio illumination, and obtaining clean bromide enlargements are among the subjects dealt with. (P. 564.)

Notices of three new publications dealing with optical calculations, shutter repairs, and improving negatives appear on page 558.

We have in the past made rather too many sacrifices to portability, one of them being the abolition of the lens hood; with most rapid lenses an appreciable increase in brilliancy will be secured if the lens be properly shaded. (P. 554.)

A brief report of the lecture on the new colour-sensitising dyes, by Professor Pope and Dr. Mills, at the Royal Photographic Society, will be found on page 559.

set well back in its mount a hood was never required, and the negatives were as bright as could be wished. Those who use lenses in "sunk mounts," unless there is separate screening as in many reflex cameras, can doubtless furnish abundant evidence in this direction, and for them a portable lens hood that can be quickly attached and removed should be regarded as an indispensable item of equipment even for ordinary work. The shallow mount was, of course, designed in the first place to fulfil the demands for lightness and portability, but for these advantages much has to be sacrificed: for one thing, the glasses of the lens itself are not protected against accidental damage as was the case with the older-fashioned instruments set well back into their mounts. It is to the maker's advantage that his lens should give its best performance without undue trouble, whereas, through an operator overlooking the need of screening, a certain instrument, while capable of the very highest work, is judged inferior to one to which it may be in every way equal except in the matter of its mounting.

THE SITE OF THE STUDIO.

There are two obvious ways of acquiring a studio, or, in fact, any other business; one being to take over an existing concern, and the other to break new ground and start from the beginning. Of the first method little need be said if the idea be to continue on the old lines, otherwise it is necessary to take into consideration the possibilities of extending and improving the volume and class of business, and in that case the proposition should be viewed in the same light as if starting a new studio.

It may be as well to remind the reader that we are just now in a state of transition from war conditions to those of normal times, and that in consequence it is very difficult to judge of the eligibility of premises or sites in districts which have been rendered prosperous by an inrush of soldiers or munition workers. Many of the special munition factories will doubtless be converted into ordinary engineering shops and mills while others will be dismantled, and the trade of the district will shrink to its pre-war dimensions. Leaving this point out of the discussion, there are many questions to be answered satisfactorily before one risks capital in a new venture.

An important one is whether the position and locality is suitable for the class of work it is intended to turn out and the price which is to be charged. Cheap postcards would not yield a living in Bond Street any more than would whole plates at five or six guineas a dozen in Bethnal Green. A good guide is to inspect closely other shops in the district, and to note the class of goods and the prices charged; this is a good indication of the tastes and means of the residents, whose orders are to be sought. The large multiple shopkeepers and stores have special experts for this work, who spend days in watching an apparently desirable position before opening a branch. If a really good position can be found it is worth enduring some inconvenience in the way of accommodation and paying a fairly high rent, as neither comfortable premises nor small expenses will lead to success if there are few orders.

The question of day or electric light is one which is closely connected with the foregoing one. We have known first-rate openings to be passed over because no daylight studio could be arranged for, and, on the other hand, where a struggling business was turned into a thriving one by closing the fourth floor glass-room and installing an up-to-date electric light installation upon the first floor. One of the greatest mistakes is to take premises because they contain the orthodox top-lighted studio. This was a necessity in the times when there was no electric light and when slow wet plates were used for portraiture, but times have changed, and our ideas must change with them.

In all photographic businesses, except those of the highest class, facilities for exhibiting specimens are an important factor. There are a few so fortunately situated that nothing beyond a brass plate is necessary to show their whereabouts. One or two dispense even with that, but it may be assumed with safety, that leaving out any private connection that a photographer may have a good window show will bring enough chance trade to cover expenses. It is not everyone who can hang upon the fringes of society and haunt the theatres and restaurants to pick up business, and to the steady hardworking man the showcase or window is a sheet anchor. One cannot obtain business without advertising in some way, and a good show is probably the cheapest way there is. One can soon fritter away a hundred pounds a year in free sittings, circulars, and other ineffective devices, while this amount spent on a higher rental to secure a good window, would prove a paying investment. In this connection it may be pointed out that if artificial light be adopted the whole business may be conducted on the shop level, and the other floors let off.

When planning premises too much space is often allowed for the reception-room, and the dark and other workrooms are pinched for space. This is a mistake, as few modern studios have a crowd of sitters waiting at once, and a large wall space covered with out-of-date enlargements is no longer a necessity, if ever it was. Dressing-room accommodation should be looked after, and in any good class establishment there should be at least two dressing-rooms, so that sitters need not be hurried in their preparations.

The proximity of undesirable businesses to a studio should not be overlooked, and, as a rule, premises should not be taken over any shop in which food is prepared or sold. There was one eminent photographer who succeeded in a studio over a "sausage and mashed" emporium, but as his work was of an exclusive character and consisted chiefly of ceramic enamels clients had to come to him in spite of the sausages.

Among minor but still important considerations are such matters as staircases and lifts. In these days people will not climb to the fifth storey to visit the photographer. Recently a photographer of our acquaintance declined a most attractive studio because it was at this elevation, and there was no possibility of installing a lift. Many profitable sitters are elderly people, and these are often deterred by the prospect of a fatiguing climb. The orientation of the studio also deserves a word. It was formerly *de rigueur* to have a direct north light, and photographers went to all sorts of trouble and sacrifice to obtain it, often building a very short studio facing north, where a much more convenient one could have been constructed with another aspect. A little consideration will show that far too much importance has been attached to this idea. In dull weather, or during the time that the sun does not strike upon the glass, there is little difference between a north or east lighted studio, while at other times translucent blinds will cut off the direct rays without unduly prolonging the exposure.

Thomas Illingworth and Co., Ltd.—At the annual meeting of the directors, held at the company's offices on December 4, Captain T. Midgeley Illingworth, R.F.A., was elected a director of the company. Captain Illingworth is the son of Mr. Thomas Illingworth, the managing director and founder of the company.

ON THE USE OF THE INTERFEROMETER FOR TESTING OPTICAL SYSTEMS.

(The Twenty-first Annual Traill-Taylor Memorial Lecture.)

In spite of the great advances in the technique of optical manufacture during the past thirty years, the definition of actual optical systems still leaves ample room for improvement. Even if we confine our remarks to the makers of highest reputation, it is only in certain of the smaller optical instruments that the imperfections of definition are inconsiderable, and even then only in the best part of the field of view. For example, in binoculars by the best makers the definition in the centre of the field of view leaves little to be desired, yet on the margin of the field it is only tolerable because nothing better has been forthcoming. Microscopes, as represented by the best combinations available, have approached very close to the theoretical limit of resolving power, though improvement is still possible; but even the best of photographic lenses are very defective when judged by this standard.

It is true that in the last instance the failure of definition is sometimes condoned by designers on the plea that the definition is as good as is justified by the grain of the photographic plate, but this is not true; and, furthermore, the plate maker might as reasonably maintain that the grain of the plate is as fine as is justified by the definition of the image given by the lens.

The imperfections of definition referred to arise from such causes as the following:—

1. In the case of binoculars and other telescopic systems the avoidance of excessive complexity in the optical system, owing to the necessity of keeping down the cost. For this reason the dioptric components of the ordinary telescope system have not yet been developed with quite such elaboration as, for instance, the photographic lens.
2. The difficulty, with a limited choice of suitable dioptric materials (for although extensive the choice is not as varied as the lens designer could wish), of obtaining the results desired by calculations based on the utilisation of spherical surfaces alone.
3. The additional difficulty in the case of photographic lenses of correcting to a high order of accuracy the defects of very oblique pencils. This results in a compromise which is differently adjusted by the various designers, but always entails a lowering of the standard of definition for every part of the image.
4. In the case of systems comprising large prisms and lenses there is a fourth cause of imperfection—that, namely, arising from the heterogeneity of the glass employed.

With reference to the last-named cause of bad definition, I may say that I have during the past twenty years examined a large number of blocks of optical glass from the main sources of supply, and have rarely found that they have been sufficiently uniform in refractive index to enable the imperfections in definition to be kept within the limits laid down by Lord Rayleigh as desirable, without recourse to the process of "figuring" or "retouching."

But in the present state of optical knowledge and technique all the difficulties will not suffice to defer much longer the attainment of more perfect definition provided the users of the present defective optical instruments can be educated up to a suitable state of irritable dissatisfaction. When the demand for greater perfection arises I do not doubt that it will be met, and among the means to that end will, I believe, be found the interferometers, some of which will be described to-night.

Let us consider some of the additional resources which the optician is having placed in his hands of late years. First of all, the great improvement in terrestrial telescopes associated with the introduction of the prismatic binocular has produced a mobility of mind in the telescope-buying public. They will readily—almost too readily—credit the possibility of still further perfection; and there would be, I believe, a readiness to pay more for something better. Secondly, an ever-increasing variety of glasses is becoming available. Then glass-makers are improving the quality of their glass. Again, mathematicians are striving to find new ways of helping the lens calculator in his work. Furthermore, certain branches of photography are in conscious need of better lenses (I may mentio more particularly cinematography and photography from the air).

To these may be added what is to me almost the most interestin of all the new resources—viz., the ability to produce (so far onl in a very limited way) non-spherical optical surfaces. A beginnin has been made by the firm of Carl Zeiss in the production of lense with definitely aspherical surfaces—best known of which are th special spectacle lenses designed by Von Rohr for those whose ey have been operated on for cataract. This firm has patented a ver ingenious method of producing such non-spherical surfaces*, an very probably is keeping other methods secret. I am not aware tha any lenses with non-spherical surfaces have been made by them wit sufficient perfection for telescopes, camera lenses, and so fort But experience shows that with my interferometers the optician ca face without dismay the task of making with precision quite considerable departures from the sphericity of his surfaces. It i therefore, very likely that valuable results may be obtained by usin apparatus of this kind to correct with high accuracy lens system wherein definitely aspherical surfaces have been generated by pr cesses essentially different from those ordinarily used by optician

At this point it is desirable that we remind ourselves what pe fection in a lens amounts to. We usually desire of a lens—

1. That it should give point images of point sources.
2. That if a number of point sources lie on a plane perpendicular to the axis of the lens, the corresponding image should also lie on a plane perpendicular to that axis.
3. That the image given by it of any plane figure perpendicular to the axis should be of the same shape as the figure itself.

Thus the first thing required of a lens is that it should give poin images of point sources; that rays emanating from a point shoul also after passage through the lens go through a point.

The conception of light as passing along rays has been, and wil continue at any rate for some time to be, of great utility to th lens calculator. But, viewed from the standpoint of the wav theory, it is a somewhat fantastic, or at least a complex, notion and that a conception which appears so artificial to modern theor should still govern the practice of lens computers is a little mortifying. But we must use the word "ray" (without attempting t define it) for a brief while longer.

If our lens is imperfect in this point image property the rays will nevertheless, at one plane in their path, be closer together than elsewhere. And if they are in that region sufficiently close togethe for the purchaser to be satisfied, the lens is good enough. As usual folk are contented with what they can get. Let us see what the are putting up with at the present time.

Fig. 1.—The photograph of which Fig. 1 is a reproduction wa taken in the following way: A good 6 × binocular was directe towards a small distant hole, behind which was a pointolite lamp

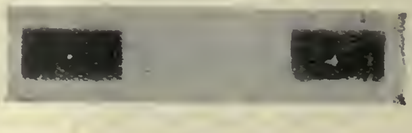

Fig. 1.

The pencil of light emerging from one eyepiece was received by a camera with a lens which was (over the field and for the aperture used) free from defects. A light filter was used to ensure that the plate would record what is visible to the eye.

Two images of the point are shown, A the axial image, and B the image corresponding with a point distant from the axis by three-quarters of the semi-diameter of the field. The external field of the binocular is 8°, so the point observed is 3° off the axis in the object space. The axial image corresponds very closely with theoretical perfection, but no one would, I am sure, maintain that the other is anything but bad.

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* British Patent 3444, 1909.

We shall now consider more critically the case of a perfect lens—one, namely, in which the rays emanating from a point pass through a point after passage through the lens.

Let us suppose that we examine the image from such a lens under higher and higher magnification—as if we were trying to discover outstanding errors.

In such a case it will be seen that the lens, if perfect, or nearly so, produces not a point image, but the well-known diffraction pattern, consisting of a central illuminated area with concentric rings around it*. This effect is the same whatever the type of lens, always provided that it has a circular aperture and is free from aberration : and given the focal length and aperture of the lens, the size of this pattern is fixed.

The effect of lens imperfections on the diffraction pattern is to make it less like a point—the falling off in intensity of illumination from the centre is most rapid with a perfect lens. In short, the best a lens can do is to produce a definite diffraction pattern; the ideal pattern is that produced by a beam of light with a spherical wave front, and any beam which departs from true sphericity of wave front will produce an inferior diffraction pattern.

A quotation from Lord Rayleigh is here very much to the point. He says :—

> "In practice there will always be a certain aberration, or error of phase, which we may also regard as the deviation of the actual wave surface from its intended position."†

Observe the meaning here assigned to the word aberration. I shall henceforth use the word in the same sense—viz., the deviation measured in wave-lengths of the actual wave surface from its intended shape. It is this which is measured by the interferometers which I am going to describe.

Lord Rayleigh has investigated mathematically the effects of small aberrations upon the image in a few specific cases, and has arrived at the conclusion that—

> "Aberration begins to be distinctly mischievous when it amounts to about a quarter period."‡

In the past few years I have examined by the interferometer very considerable numbers of optical elements—both lenses and prisms—which have exhibited a great variety of imperfections, and my experience confirms that Lord Rayleigh's rule (which was derived from the calculations of light intensity distribution for a few specific cases) is reliable for every variety of aberration, whether regular or irregular; and that an optical element cannot properly be described as of first quality if it produces aberrations greater than ¼-wave length.

Description of the Interferometers.

We will now proceed to a consideration of the forms of interferometer which have been developed in the workshops of Adam Hilger, Ltd., for measuring the aberrations of lenses, prisms, and other optical elements. These have already been described in the Patent Applications,§ in a small booklet issued by Messrs. Adam Hilger, Ltd., and in the "Philosophical Magazine."‖

In its simplest form this instrument resembles the well-known Michelson interferometer, the main essential optical difference being that the two interfering beams of light are brought to a focus at the eye of the observer.

Optical elements or combinations suitable for examination on it may almost all be classed in two categories. Into the one category fall those combinations which are required to receive a beam of light which has a plane wave front and deliver it again after transmission with a plane wave front, and in the other category fall those the object of which is to impart spherical wave fronts to beams which are incident on them with plane wave fronts. The two corresponding arrangements will be referred to as the prism interferometer and the lens interferometer respectively.

Fig. 2.—The prism interferometer is shown in the diagram (Fig. 2) as arranged for the correction of a 60° prism, such as is used for spectroscopy.

The light used must consist of a limited number of very homogeneous radiations. Such a light may be obtained from a Cooper-Hewitt Mercury Vapour Lamp.

The light from the source is reflected by the adjustable mirror A through the condensing lens B, by means of which it is condensed on the aperture of the diaphragm C.

The diverging beam of light is collimated by a lens D, and falls as a parallel beam on a plane parallel plate K, the second surface of which is silvered lightly, so that a part of the light is transmitted and part reflected. The major part should be reflected. One part passes through the prism L in the same way as in actual use, and being reflected by the mirror F, passes back through the prism to the plate K. The other part of the light is reflected to the mirror G and back again to the plate K. Here the separated beams recombine, and passing through the lens E, each forms on the eye placed somewhat beyond the aperture in the diaphragm P an image of the hole in the diaphragm C.

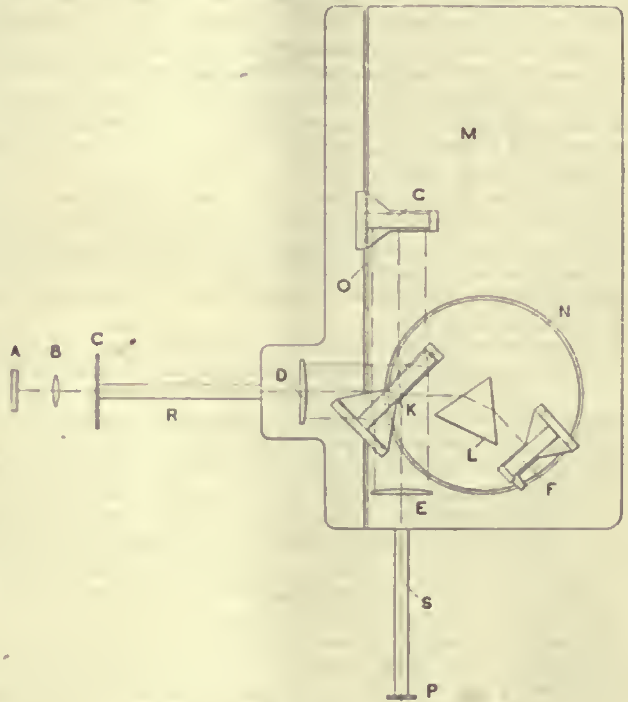

Fig. 2.

F. W. Twyman.

(To be continued.)

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Demobilisation and Re-settlement.—The attention of employers and workpeople is drawn to the activities of the Local Advisory Committee recently set up by the Minister of Labour in connection with the City of London Employment Exchange, 9, New Bridge Street, E.C.4.

In addition to assisting the Exchange in its extensive work of supplying suitable men and women for clerical and professional occupations in the City, the primary functions of the committee relate to the employment of men now being discharged from H.M. Forces (including questions as to the wages which ought to be paid to disabled men) and also to the arrangements for dealing with reconstruction problems from the labour point of view.

The Minister has been fortunate in securing Sir T. Vansittart Bowater, Bart., as Chairman of this committee, together with many prominent citizens—representative of employers and labour organisations—who are intimately acquainted with trade conditions in this area.

The committee has already held several meetings, and there seems every prospect that it will be able to render valuable assistance to the Government in achieving the important objects for which it has been established.

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* Excellent photographs of these diffraction patterns are given in that valuable little book by Mr. Dennis Taylor, published by Thos. Cooke and Sons, of York entitled, *On the Adjustment and Testing of Telescope Objectives.*

† Scientific Papers, by John William Strutt, Baron Rayleigh, 1902, Vol. III, p. 100.

‡ Scientific Papers, *Phil. Mag.*, Vol. viii, pp. 403-411. A summary of the mathematical work done in this direction will be found in a recent contribution to the subject, "Light Distribution round the Focus of a Lens, at various Apertures," by L. Silberstein, *Phil. Mag.* vol. xxxv., January, 1918.

§ British Patent, 103,832/16, and corresponding Foreign Applications.

‖ Vol. xxxv, Jan., 1918, p. 49.

THE SHORT-FOCUS LENS IN PORTRAITURE: ITS OCCASIONAL USEFULNESS.

A recent article in the columns of "The British Journal of Photography" by Mr. D. Charles on the use of a short-focus lens in portraiture is calculated to induce amongst inexperienced photographers a very exaggerated idea of the so-called distortion of the features due to a near perspective, and so to prevent them from availing themselves of the advantage which in some cases they might gain by the use of a lens of short focus.

I do not wish it to be inferred that a lens of short focus is to be preferred for general work. My own practice has been to use lenses of rather long focus for portraiture for the most part, but there are occasions when a better result can be obtained with a lens of shorter focus, and a photographer should not be debarred from producing the best result obtainable by objections based on a miscalculation of the extent of a drawback so slight as to be generally unnoticeable and therefore negligible.

I propose to show in the first place that the difference in the proportion of the features between a portrait of given size taken with a short-focus lens and one taken with a lens of longer focus is so slight as to be generally inappreciable, and may therefore be disregarded; and in the next place to show where the short-focus lens has a positive advantage.

Some years ago, in connection with a lantern lecture on Perspective in Photography, I prepared negatives of identical subjects taken to one size as regards height, but with lenses of different focal lengths, so as to show the perspective effects as seen from a near and from more distant standpoints. One pair of slides showed the figure of a man standing nearly sidewise to the camera, with one arm extended backwards so that the hand touched the background, the other arm stretched forwards nearly in a line with the camera. In this case the disadvantage of the near perspective given by the lens of short focus (4½ inches) as compared with that shown in the photograph taken from the standpoint required by the lens of longer focus (11½ inches) was very obvious.

Another set of negatives was made showing bust portraits of a lady, with the head about three-quarters of an inch in height, and with lenses of 4½, 11½, and 18 inches focus respectively, and from these distances—about the same in feet as the focal lengths of lenses in inches—necessary to obtain the face of the same size in each case. Transparencies from these negatives were mounted as one slide, and the image was thrown on the screen in the course of a lecture at the Polytechnic Lecture Hall. I said that I thought it would be difficult to discover which was the photograph taken with the shortest focus lens. One of the audience thought that he could detect it and indicated one, which, however, was the wrong one.

I think it is evident that the "distortion" due to perspective even from so near a standpoint as four or five feet is, in the case of objects so nearly on a plane as the human features, so slight as to be negligible. Further, it may be observed that we are in the habit of noticing and studying our friends' features more from the distance corresponding to that of a portrait taken by a short-focus lens than at that represented by a lens of long focus, so that if there were any noticeable difference in the proportions in the two cases the short-focus image would more nearly correspond to our impressions of the subject. This argument may also be adduced against Mr. Charles' proposition that a sitter's dissatisfaction with his portrait may in many instances be put down to "unsuspected distortion of the features" (due to the use of a short-focus lens). The sitter's view of himself that he gets from a mirror is likely to be from a nearer standpoint than that from which a portrait would be taken even with a short-focus lens.

If, as I think has been shown, there is no noticeable distortion of the features in photographs taken with lenses of short focus at the moderately short distances likely to be used by photographers, and if a short distance is that from which the original is usually closely observed, Mr. Charles' final contention that "the apparent distortion due to a short-focus lens by reason of the nearness of the viewpoint it compels is a good deal worse than any that may result from stretching of the prints" in wet-mounting, is effectually disposed of.

Now for the cases where the short-focus lens has a positive advantage over that of a lens of long focus. The most obvious is where there is not room to get far enough away from the subject. The use that I have particularly in mind, however, is to minimise the effect of the hazy weather which prevails so much in London in winter time. The particles of haze or fog in the air, illuminated by the lighting of the studio, cause a veil of fog to appear on the negative with an effect that is often damaging, and sometimes destructive, to the brightness of the image. Obviously the nearer the lens is to the sitter the less illuminated atmosphere there will be to fog the picture. I remember in the days before starting in business on my own account showing my principal a negative taken with a shorter-focus lens than would usually be employed for the size of plate, and his remark, "Bravo short-focus lens."

It is not only head and bust portraits that may usefully be made with a short-focus lens. With skilful posing three-quarter length figures, and groups of two or three figures, or even a larger number, can be so arranged that no part shall appear noticeably too large or too small when taken at the short distance necessitated by the use of a short-focus lens.

Another plan for diminishing the evil of fogging by interposed illuminated air, is the use of a movable tunnel running on castors. I regularly used these in my own studios, but they are rather unsightly, and at all events are not to be found in most studios.

One matter mentioned by Mr. Charles is the height of the camera. He says, "It is more usual to have the lens at about the level of the top of the sitter's head." This is not in accordance with my experience and observation. With the lens at that height the head is apt to appear sunk in the shoulders, the neck to be shortened, and the subject to lose dignity. I think that a more usual height would be found to be a little below the level of the chin for a sitting figure, and about the level of the middle of the chest for a standing figure. W. E. Debenham.

New Books.

A Simplified Method of Tracing Rays through any Optical System. By Ludwik Silberstein, Ph.D. London: Longmans, Green and Co. 5s. net.

By employing the methods and formulæ of vectorial algebra, the author has shown the very great simplification which results in the customarily laborious process of tracing the course of reflected or refracted rays through lenses, prisms, and mirrors. The necessary vectorial algebra is not of an advanced kind, not more than the average mathematical optician can master in a few hours, and Dr. Silberstein's text-book sufficiently shows the simplicity of the method from the fact that the formulæ occupy only one or two pages, the bulk of the book being devoted to examples of their application. It is satisfactory to see that the English literature of applied optics is being supplemented by manuals such as the present, one of the aims of which is essentially practical whilst its conception is original.

Illustrated Guide and Descriptions of Photographic Inter-lens Shutters, with Directions for Cleaning and Repairing. By William O. Hammer, San Francisco. $2.50.

A book which will be of great value to all engaged in the apparatus trade, and, indeed, to many photographers, has been issued by Mr. William O. Hammer, of San Francisco. It consists of a series of enlarged photographs of the interior mechanism of most of the best known models of between-lens shutters, with actual-size illustrations of the exteriors, both being lettered to indicate the moving parts. Opposite each plate is an index to such parts, with full notes as to dismounting and reassembling them. The illustrations are prefixed by some practical hints upon the cleaning and adjustment of inter-lens shutters. A rather curious feature is the indexing of the outer fittings and adjustments of the shutters and the small number of reference letters on the interior parts. However, the diagrams are very clear, and it is very easy to see from them if a shutter has been correctly assembled after cleaning.

Retouching and Improving Negatives.—A little manual which as soon as it is readily obtainable in this country should be bought largely by professional portrait photographers is that which forms No. 171 of "The Photo-Miniature." Within forty pages it deals very practically with the improvement of the negative for printing in the broadest sense—that is to say, not simply by retouching with knife or pencil (although this is the staple of its subject-matter), but by appropriate chemical treatment of the negative and by working on the glass side. After all there can be no substitute for self-instruction by practice in retouching, but the hints in this manual will set the beginner in retouching on the right road and enable him to progress rapidly, particularly if a skilled retoucher can be persuaded to criticise his early work. The manual is illustrated by a number of drawings of retouching tools and appliances, and is altogether a handbook which will recommend itself to the study of those in any way interested in the making of portrait negatives. Though "The Photo-Miniature" is not yet, we believe, again obtainable in this country, single copies may be had direct from the publishers, Messrs. Tennant and Ward, 103, Park Avenue, New York, price 1s. 6d. in stamps or international coupons.

THE WELLCOME EXPOSURE RECORD AND DIARY.—Users of this most handy of photographic notebooks, who have proved its indispensability by constant use, will not willingly forgo buying a copy of the issue for 1919, which embodies a very notable improvement in the well-known exposure calculator. Messrs. Burroughs Wellcome have improved this latter in practically the only way in which it was susceptible of improvement. Hitherto the calculator has indicated only the exposure for one given stop, those for other diaphragm apertures being ascertained by a supplementary computation for which the calculator did not completely provide. In the new pattern which appears in the 1919 Diary this difficulty is removed by a modification of the design of the rotating disc and by printing certain of the numbers in a different colour. The operation of finding the exposure is thus very simple. The rotating disc is placed with the number representing the particular subject in alignment with the number representing the light-value. With the previous pattern of calculator this would have shown the exposure at f/8 only. With the new calculator the disc is again turned into a second position, which is chosen by bringing the pointer of the disc opposite to the light-value figure, which was faced (on the first adjustment) by the figure representing the speed of the plate. In this second position the exposures for all apertures from f/4 to f/32 are shown simultaneously. There is no doubt that users of the diary will immensely appreciate this new feature, which brings the calculator upon a par with the appliances sold for this special purpose. The text portion of the diary remains the same concise and practical guide to photographic operations which has hitherto been its character. The many users of "tabloid" chemicals will appreciate these comprehensive data by which the processes of development (including time development), toning, intensification, etc., are reduced to the simplest form. The greatly increased cost of paper, printing, and binding has its counterpart in the price of the diary, which is now 1s. 6d.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SATURDAY, DECEMBER 14.

Huddersfield Naturalist and Photographic Society. "Local Experiments with Bacteriised Peat." Dr. T. W. Woodhead, M.Sc., F.L.S.
North Middlesex Photographic Society. "The Order of St. John in the Past and Present." H. W. Fincham.

MONDAY, DECEMBER 16.

Bradford Photographic Society. "Some Famous Yorkshire Ruins." J. Marston.
Dewsbury Photographic Society. "The Lens and the Plate." N. Ruddlesden.

TUESDAY, DECEMBER 17.

Royal Photographic Society. "Shakespeare's Town, Stratford-on-Avon." J Booth.
Manchester Amateur Photographic Society. Exhibition of Photographic Portraits.
Halifax Scientific Society (Photographic Section). Ladies' Evening.
Leith Amateur Photographic Association. Federation Slides.

WEDNESDAY, DECEMBER 18.

Croydon Camera Club. A Display of Prints by Members.
Ilford Photographic Society. "Retouching." At 14, Ranelagh Gardens.
Dennistoun Amateur Photographic Association. Christmas Calendar Competition. Members.

THURSDAY, DECEMBER 19.

Brighouse Photographic Society. Demonstration. W. Rhodes.
Huddersfield Naturalist and Photographic Society. "Andalusia." J. C. North.
Hammersmith Hampshire House Photographic Society. "One Man Show." W. Benington.
Liverpool Amateur Photographic Association. "Ten Years in Germany." J. Montgomery.
Rodley and District Photographic Society. "Toning Bromide Prints." Messrs. Dobson and Lockwood.
The Camera Club. "George Sand and Her Country." P. Allen.

ROYAL PHOTOGRAPHIC SOCIETY.

MEETING held Tuesday, December 10, Mr. F. F. Renwick in the chair.

A communication by Professor W. J. Pope, F.R.S., and Dr. W. H. Mills entitled "Studies on Photographic Sensitisers," was delivered by Dr. Pope.

Professor Pope briefly sketched the development of the colour-sensitising of photographic plates from the original discovery of Vogel in 1873. The action of a dye in rendering plates sensitive to rays of longer wave-length soon received a most important advance by the discovery of eosine for this purpose by General Waterhouse in 1875. Other dyes allied to eosine came into use, but a fresh and most important development of the subject did not come about until the introduction by Miethe in 1903 of ethyl red, a dye of the isocyanine class, further derivatives of which were manufactured by German firms. Pinaverdol and pinacyanol were the two chief dyes of this kind and were the substances widely employed for the colour-sensitising of plates. When, within some time of the outbreak of war it was feared that the stocks of these dyes in the country would not be sufficient for the continued manufacture of colour-sensitive plates, Professor Pope in collaboration with Dr. Mills took up the two questions, viz., of making these specific dyes and of investigating the modifications in the constitution of such dyes which affected, in one way or another, their colour-sensitising properties.

Professor Pope proceeded to show the chemical constitution of a typical isocyanine dye consisting of the condensation product of a quinoleine and quinaldine group. He traced the various derivatives which could be prepared by the introduction of other radicles into the isocyanine complex. Their experiments had shown that there was a direct connection between the compound formed by introducing a radicle such as methyl or ethyl and the colour-sensitising quality, according to the molecular weight and the position which it occupied in the complex. Other experiments had equally demonstrated the interdependence between sensitising power and the constitution of the compound formed by the introduction of acidic radicles.

At the conclusion of the lecture an experiment prepared by Mr. Renwick and performed by Mr. Bloch was made, showing the enormous power conferred on the plate-maker by the new sensitisers in the way of producing sensitiveness for any given part of the spectrum. Of two plates, one was printed by blue light and developed in a red illumination such as would ordinarily be regarded as non-actinic, whilst the other was loaded into the frame by the blue light, exposed to the red and the image developed in the blue illumination.

On the proposition of the chairman the very hearty thanks of the audience were accorded to the authors of the communication.

CROYDON CAMERA CLUB.

MR. V. JOBLING gave a capital demonstration on "Darkroom Dodges and Workshop Wrinkles," a title which might convey anything from the melodious process of sharpening an old saw to the poetic idea of teaching a good-looking receptionist how to develop a plate in semi-darkness. Of the many really practical, and in some cases novel tips, only a few can be selected capable of description without diagrams or illustrations. On starting, the lecturer paid a not unusual compliment by saying he felt nervous at appearing before such a well-known critical faculty, all the more so as the desirable beginner appeared to be absent. As it happened, appearances were deceitful.

Beginning the actual exposition with the workbench, a strong recommendation was made for waterproofing the wood with white paraffin wax, which can be bought having a comparatively high melting point. This is worked in with a hot flat-iron. Linoleum was also good, but not so resisting to spilt solutions as the waxed wood. For safe-lights he invariably used the Lumière papers, which are cheap and good, and supplied in three colours—yellow, red, and green. Either singly or in combination they could be employed for gaslight and bromide papers, ordinary and ortho plates, and the last for Lumière's red-sensitive plates, and possibly for other panchromatic plates, but these had not been tried.

For dilution of developers he keeps on the shelves bottles filled with boiled water, fitting the one in use with the familiar wash-bottle pouring device. He deprecated, especially in winter, diluting the developer by drawing water from the tap, which might cause its temperature to differ from the surrounding air. In such an up-to-date club as Croydon he assumed all developed by the standard time system, when, in the absence of special provisions, it was of importance to have the developer of the same temperature as the air. As sound advice as the assumption was unwarranted. He preferred a flat dish to tanks, and showed most ingenious separators for keeping the plates apart.

Discussing corks, he suggested the contents of any bottle should be inscribed on its cork to prevent the bottle accidentally receiving the wrong cork. This method should specially appeal to those whose practice is to remove all corks in sight before starting work. It here transpired that the careful Mr. Witterick ties the cork to the neck of the bottle, but Mr. Reynolds said it was far better to reverse the procedure and tie the bottle to the cork. It is flashes of genius of this sort which have given Mr. Reynolds an established position in the club.

Quite a neat device shown consisted in drilling in a flat dusting brush close to the ferrule two holes, and then driving in short wooden pins projecting on each side, which keep the hairs of the brush away from the surface of the table or bench when the brush is laid down. At this point a controversy arose as to whether these brushes removed dust from the film or transferred dust to it, which difference of opinion introduced a fine dust-up of another variety.

Those who employ a printing frame as an enlarging easel may have found that the curl of the paper makes its insertion awkward. Mr. Jobling uses a shallow printing frame for the purpose, lays the frame flat on the table, back upwards, and inserts in the opening a piece of loosely fitting card roughly the thickness of the frame from the front to the rebate. This gives a level surface on which to place the paper, and on inserting the back and lifting up the frame the card remains on the bench. The simplicity of this little idea made all laugh. For binding lantern-slides all may not know how useful two miniature "bull-dog" clips are, clipped opposite each other, which permits of the free sides being bound, with no fear of slipping.

Here is a nobby idea for a plate-rack:—Procure a rod of wood (exact diameter of no particular importance) and plane a flat along its length for it to rest on. Coarse saw cuts on top made at regular intervals complete the appliance. Only a corner of each plate is inserted in the saw cuts, the plates being placed alternately on the left and right of the rod. The chairman, Mr. Keane, found the improvisation excellent also as a tobacco stopper for his pipe.

Many find a difficulty in cutting glass with wheel cutters, and speaking from memory a writer some time ago in the "B.J." declared them useless for cutting unexposed dry-plates owing to particles of glass becoming embedded in the film. The writer erred. Being of an economical turn of mind, Mr. Jobling, with a wheel cutter habitually cuts up 5 x 4 plates to 6 x 4.5 c.m. size, and experiences no trouble whatever from particles of glass which do not participate, but he obviously knows how to handle the tool. The cutter, he said, must never be held quite vertically, and a quick and even stroke, together with a feeling of confidence, should be cultivated. In the cutting gauges shown, the edge of the glass where the cut terminates abutted on to a slip of wood about the thickness of an average negative (or, perhaps, a little thicker) with a narrow bevel so that thinner glass could be cut without that awkward jump of the cutter at the end of the stroke. In some cases a piece of glass the same as that being cut can take the place of the wooden stop. It is just ideas of this sort, easily overlooked, which may make the difference between success and failure.

The foregoing are fair samples from bulk of a demonstration which was accorded a most hearty vote of thinks. The club also secured Mr. Jobling as a member, mainly the result of two years' patient sleuth hound work on the part of its secretary, Mr. Sellors. The discussion permeated the exposition and expanded on its close. Mr. Reynolds contributed a useful tip. He had discovered that writing could be executed upon glass with a pointed piece of aluminium. Two things were essential—considerable pressure, and the glass must be well wetted. The writing, he said, appear to be indelible.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

The third meeting of the session 1918-19 of the Edinburgh Society of Professional Photographers took the form of a dinner at Messrs. Ferguson and Foresters, Princes Street, on Tuesday, December 3. The company, including guests, numbered thirty. After the Royal toast, an attractive programme arranged by Messrs. Swan, Watson and Campbell Harper was submitted, the number of encores showing the popularity of the items. Mr. Robert Scott proposed the toast of the Society, and touched on various points concerning its welfare.

Having complimented them on the qualifications of the members whom it had elected as its committee, and particularly on having secured as their president Mr. Ed. Drummond Young, who, he said, was a gentleman with a broad outlook and progressive ideas, and the courage to put these into action, he went on to say that, having put these men into office, it was the duty of each and every member to give them not only passive, but active, support in the work of the society.

In associations of this kind members were too prone to pay their annual subscriptions and then let their interest rest there.

It was not a question of a member paying his subscription and then at the end of the year asking what the society had done for him, but, what had he done to promote the welfare of the society in return for the privilege of being a member?

Their success would be the measure of the unselfish service rendered by each individual member.

Mr. Scott also deprecates severely such an attitude as that taken up by a correspondent in the "British Journal of Photography" recently, under the nom de plume of "Diogenes," and compared it with the helpful and constructive criticism of Mr. T. Horace Chapman, whose letter appeared in the same issue, Mr. Scott's contention being, whilst criticism was welcomed, it was imperative that such should be helpful and kept free from undesirable personalities.

After expressing the hope that the inauguration of the Edinburgh Professional Photographers' Society would prove to be of benefit not only to the Edinburgh Photographers, but also to the followers of the craft throughout the whole of the British Isles, the toast was put and responded to heartily by the company.

The Chairman, in replying to the toast of the society, thanked Mr. Scott for the kindly comments and helpful criticism, especially the point that the members should not confine their interest to the paying of the subscription. Touching on the various projected activities of the society, much that had been proposed was, owing to the war, impossible of development, but now, thank God, the war was over. Continuing, Mr. Young said he had hoped to report some progress in connection with the retouching class. The board of the College of Art had asked him to meet a small committee of four members of the board and put before them the views of the society on the proposed class, he had asked Mr. J. S. Johnston and Mr. Campbell Harper to accompany him to the meeting and make it more representative. Unfortunately, owing to the illness of the chairman of the board, this had not taken place yet.

One project which he hoped would materialise was the professional exhibition, and in this connection he would like to see all professionals taking part, the man who charged 5s. as well as the man who charged £5. Too often it was the man with the big or high-class business who represented photography. Given this enthusiasm enjoined by Mr. Scott, what is to hinder the establishing of branches, beginning with one in Glasgow, and from that to a Scottish Federation, with a proper business congress? He was against the extravagant entertainments given by the large manufacturers. It kept smaller firms from showing their products, which might happen to be of more interest professionally, and it also turned what should be a business congress into a jaunt. At the congress he attended a few years ago, the only meeting where the members had some discussion and had an opportunity of hearing each other's opinions was crowded into one afternoon.

Concluding, the chairman emphasised the point of view that this was a business society for professionals.

The toast of the Ladies was proposed by Mr. Campbell Harper, and wittily replied to by Miss Gray.

The evening finished with the singing of "Auld Lang Syne."

Commercial & Legal Intelligence.

ALLEGED FALSE PRETENCES.—At the Reading Borough Police Court, before Mr. J. J. Cooper, Harold Aylmer Jones, of 30, Hill Street, Richmond, was charged, on remand, with obtaining by false pretences the sum of £20 from Francis W. Foulsham, photographer, of 63, Wokingham Road, Reading. Mr. E. D. Berry, who appeared for the prosecution, said that Mr. Foulsham first got into touch with the defendant by reason of an advertisement which the latter inserted in the "British Journal of Photography." The address given in the advertisement was: Ward's, Brixton Road. Prosecutor asked for terms for printing 10,000 picture post card views of Bear Wood Convalescent Camp, and received a quotation which worked out at £40. On October 18 Mr. Foulsham went to Ward's studio at Brixton and found the door locked. As he was going away he met defendant. Business was discussed, and defendant promised to execute quickly the order, in respect of which there had been negotiations. On October 30 prosecutor received a letter from the accused on note paper headed "C. E. Fry and Sons, South Kensington, proprietor, Aylmer Jones," asking for a cheque, and stating that he would lose on the order, as the price of postcards had advanced. At that time Mr. Foulsham was laid up with influenza, and he wrote cancelling the order. On November 6 accused came to Reading, and represented that he was carrying on business as C. E. Fry and Sons, Gloucester Terrace, South Kensington, and asked Mr. Foulsham to again give him the order. On defendant's representation prosecutor gave him the order, Jones promising to send him some cards the next day and to complete the order the following week. Mr. Foulsham also gave defendant a cheque for £20 on account. No cards came along, and after unsuccessful efforts to get into telephonic communication with the defendant Mr. Foulsham went to London. He called at the studio at South Kensington and found it closed. He then went to the Brixton studio, and as that was closed also he made inquiries of the Brixton Police, who referred him to Richmond. He proceeded there and saw the prisoner's wife; in consequence of his inquiries he communicated with the Reading Police and a warrant was issued for the prisoner's arrest.

Prosecutor gave evidence in support of his solicitor's statement, and said that on November 13 he went to the studio at South Kensington and found it closed; there was a card in the window stating that the studio would be closed until further notice. He looked through the windows, and saw some waste paper and straw. The premises did not appear to have been occupied for some time. There was also a "To Let" card in the window. He had not received any of the cards, nor had the negative been returned.

Cross-examined by the defendant, prosecutor said he knew it was usual in the trade to pay cash with orders. He admitted writing a letter to defendant on November 14, the date on which he had obtained the warrant for his arrest, offering him more work and a cheque on account, but he wrote the letter merely as bluff because he wanted to find out where he was. He did not know he employed several assistants at South Kensington.

Gilbert J. Wright, upholsterer, of 6, Gloucester Terrace, South Kensington, said that defendant had carried on business as a photographer at a studio adjoining his premises. Defendant started there in March. About September the bailiffs entered and the goods were cleared, but since early in October he had seen no business carried on there.

In answer to the defendant, witness said that he did not know that although the studio furniture was removed, the printing press was left in a room in the basement.

Detective-Sergeant Henderson gave evidence of arrest. After the warrant was read to him the accused said: "The charge is absolutely ridiculous. I did not get the cheque until a week ago, and it takes three weeks to complete the work. Defendant subsequently said that he was absolutely surprised at the charge.

The defendant declared that he had no idea whatever of obtaining money by false pretences. He was given the order in the ordinary way, but had not had time to do the work. He had acted quite bona fide throughout. He did not want Mr. Foulsham's money, and would return his cheque for £20, with pleasure.

The magistrates retired to consider their decision, and on returning into court the Chairman said that they were strongly of opinion that the evidence for the prosecution was not sufficient to warrant a conviction, and, therefore, the charge would be dismissed.

NEW COMPANIES.

VICTOR PHOTOGRAPHICS, LTD.—This private company was registered on December 3, with a capital of £10,000, in 8,000 ordinary shares of £1 each and 40,000 deferred shares of 1s. each. Objects: Manufacturers of and dealers in photographic papers, plates, films, chemicals, apparatus and sundries, etc. The subscribers (each with one share) are:—M. Howard, 59, Sandringham Road, E.8, clerk; L. W. Munday, Belgrave, Church Road, Northwood, Middlesex, clerk. The subscribers are to appoint the directors. Registered office: Albion House, 56-61, New Oxford Street, W.C.1.

PHOTOCOL, LTD.—Registered November 28, with a capital of £115,000, in 100,000 10 per cent. non-cumulative preference shares of £1 and 300,000 ordinary shares of 1s. each. Objects: Photographers, photo-enlargers, photo-etchers, photo and colour printers, manufacturers of photographic plates, emulsions, and printing papers, etc. The subscribers (each with one preference share) are:—A. S. Prall, Elscott, Parkland Grove, Ashford, solicitor; C. T. Little, 7, Dorncliffe Road, Fulham, S.W.6, clerk. Subscribers are to appoint the directors. Registered office: 7, Queen Square, W.C.

JEWELLERS, MINIATURES, LTD.—Capital £500 in £1 shares. Objects: to carry on the business of miniature producers, photographic printers, etc. Signatories (each with one share): P. S. Neave, 41, East Street, Baker Street, W., furniture dealer; A. H. R. Johnson, 6, Hanover Square, W., antique dealer. First directors: J. Pearce and G. S. Cummings. Solicitors: Sparks, Whitehouse, Russell and Co., 32, Walbrook, E.C. Private company.

T. P. PARKES AND CO., LTD.—This private company was registered on December 5, with a capital of £5,000 in £1 shares. Objects: Manufacturers of and dealers in chemicals, and dealers in photographic materials and optical instruments, etc. The subscribers (each with one share) are: T. P. Parkes, 114, Wickham Road, Brockley, S.E.4, chemical merchant; J. S. Allen, 52, Clarendon Road, S.E.13. Registered office: 24, Thavies Inn, E.C.

News and Notes.

WINDOW LIGHTING.—At Hull, last week, Mr. T. C. Turner, of Regent House, Anlaby Road, was summoned under the Lighting and Heating Order for displaying an electric light in the window of his shop.

P.C. Drury said he saw the shop window illuminated with an electric light on the night of November 19. Sergeant Jackson said that he also saw the light on the night of November 20.

Defendant contended that his business premises was not a shop, inasmuch as he had nothing to sell. There had been no extra consumption of electricity because of the light, which had in reality only been moved 2 feet in order to illuminate the pavement. It was a dangerous corner, and there had been many accidents. Defendant contended that it was in the interests of the city to do this. In Bridlington, where he resided, he had been requested to do so.

The Bench respited judgment on payment of costs.

SHEFFIELD AND DISTRICT PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.—The monthly meeting of the above association was held at Stephenson's Café, on December 4. Mr. Dickinson presided over a representative meeting, and, after business had been disposed of, Mr. Duncan gave a very bright and interesting lecturette entitled, "How to Save on your Plate Bill." Mr. Duncan's practice is to save by using a Continental size of plate instead of the usual British size; for instance, in place of the 5½ x 3½ for postcards, he uses a plate measuring 5¾ in. x 3⅝ in., which comes considerably cheaper—on a quantity, of course—than the postcard plate. A slightly larger rebate is left at the bottom of the card, but this does not detract from the quality of the card. The use of 6 in. x 4½ in. plate in place of the ¼-plate was recommended; also suggestions made for saving on larger sizes up to 12 in. x 10 in. Altogether a most lucid demonstration on the possibilities in the way of plate economy. The great interest of the audience was shown by the number of questions addressed to Mr. Duncan. A hearty vote of thanks was accorded the lecturer for his very instructive effort. The next meeting of the association is to be held at the studio of the President, Mr. Dickinson, 327, Glossop Road, Sheffield, on January 8, 1919, when members are promised some reminiscences from the business experience of—probably—Sheffield's oldest professional photographer. Other good things are hinted at. Sheffield and District proprietors and managers are welcome as members. The Secretary's address is 137, Pinstone Street, Sheffield.

Correspondence.

. *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

. *We do not undertake responsibility for the opinions expressed by our correspondents.*

A PHOTOGRAPHER WANTED.

To the Editors.

Gentlemen,—Will you, through the medium of the "B.J.," kindly help me to find the photographer who photographed Major Bodine, of the Irish Guards, in 1915? He has recently been killed, and his relatives have no photograph of him, although they know that he was taken in uniform in that year.

I shall be very grateful for any information.—Yours faithfully,

2, Vinery Villas, N.W.8. Alfred Ellis (Ellis and Walery).

MATTERS OF PROFESSIONAL MOMENT.

To the Editors,

Gentlemen,—It is not likely the progressive assistant will place confidence in an association that does not extend a helping hand. If the P.P.A. ever wants his confidence it must first set about earning it, and by its actions remove every suspicion.

Mr. Foster Brigham brings no new arguments in opposition. I assure him I have not changed my opinions, and he has failed, so far, to give any sound reasons why I should do so.

Your leading article, "Competent Assistants," hits the nail on the head. Employers must help assistants, and my contention is that the P.P.A. should back them up in every possible way, organising an Associates' section with that object in view.

Progress must be made in spite of wrathful reactionaries.—Yours faithfully, T. Horace Chapman.

15, Cleveland Street, Stourbridge, December 7, 1918.

ASSISTANTS IN PEACE CONDITIONS.

To the Editors.

Gentlemen,—As an assistant I had read with interest the discussion by worthy gentlemen of the P.P.A. as to how we assistants can be made more efficient in view of the altered conditions. While I feel sure the majority of assistants will be glad to avail themselves of any opportunity to develop their capabilities, drastic alterations would first seem necessary. Pre-war conditions, with long hours and poor wages, killed any further interest in photography after the day's work was done. May we anticipate reformed conditions in this new world we are promised on our return to civilian life? I fear the great increase of women's labour will make competition more keen, and our only hope for improved conditions will be if we establish a trade union organisation for ourselves. Compromise will accomplish nothing.

For three years prior to the war I held a comfortable berth as principal operator in a first-class studio, and am happy to say I had exceptionally good conditions and salary; but my earlier experiences of long hours, bad pay and conditions convince me a trade union is necessary to make such conditions the rule and not the exception.—Yours faithfully,

"Two and a-Half Years' Service Photographer."

THE REFLEX CAMERA.

To the Editors.

Gentlemen,—Mr. Corkett's letter is interesting, not only as an addition to the history of the evolution of the modern reflex camera, but also to me personally, as, about the time he mentions, a fellow member of the old Camera Club, Mr. B. W. Wild, and I designed a reflex camera, more particularly for pictorial work; and, by a curious coincidence, on turning over some old photographic memoranda last week, I came across some of the first plans made for the purpose, and the next day read Mr. Corkett's letter.

Enclosed is one of the earliest of these plans, and it will be seen the special features differentiating it from all the reflex cameras then in existence was the swing, and rising front to the lens. I cannot put my hand on the completed plans, on which a provisional protection was granted (in, I think, 1890), and, as I was not able to interest any camera manufacturer in the camera and left London, I dropped the matter.

At this distance of time, I believe there were not more than half a dozen reflex cameras then on the market, amongst them being the Artist, sold by the London Stereoscopic Company, the Vanneck by Watsons, Loman's by Mawson and Swan, McKellen's by Marion, and Underwood's Reflector.—I am, yours, etc.,

Dec. 9. A. R. F. Evershed.

ASSISTANTS IN THE FUTURE.

To the Editors.

Gentlemen,—With great interest I have read your Editorial on the subject of competent assistants. You are deserving of much praise for the encouraging and enthusiastic review of the situation. I fancy one of the chief faults with the master men has been largely due to the policy of drift. At the same time much excuse can be offered, for one's personal time or attention has been so occupied, the training of assistants has been almost impossible, and we have been forced to make the best of the circumstances, and be carried on by the sweeping tide of events. Then there has been the constant thought of how we should like to have things done to save our time and material, our clients' tempers, and our own, too; but it's nearly all passed now, and we must see to it that a better system is introduced by the profession which will enable us to obtain dependable assistants and avoid the serious delay and trouble of having to test quite a number before satisfaction is attained.

As soon as Christmas is over we shall be confronted with quite a list of very urgent and serious questions, many of which will call for much thought and a coalition of brains to meet the situation.

Since I have been on special war work at South Kensington I have had an opportunity of viewing matters of this kind from quite a different aspect, and have formed many very strong conclusions.

One is that old methods will need much revision, and we shall have to install method and system where drift has hitherto satisfied us. We must be ready and equip ourselves for the new world of photography. Our standards in every department must be higher and better organised. One is thankful to see evidence of unrest and determination on all sides for progress and advance.

There must exist a better spirit of unity and understanding between master and assistants. Better working accommodation, shorter hours where close work is concerned, or, perhaps, a longer interval during midday; in fact, where the master studies his assistants he is repaid in more ways than he is perhaps aware of.

Professional photography must dominate the position it is worthy to occupy; at present it does not; it is far from doing so. It can and shall, if we like to make the effort. I am alive to certain facts, and am determined, if I can obtain sufficient support, to back all efforts to place professionalism in the position it deserves among the arts in the new era. Photography during the war has played a very important part, but, I may say, not so important a part as it ought to have done; history alone will prove this. We were all too busy to concern ourselves about it, and whilst we remained silent we ought to have persistently been working, suggesting, and organising for and on behalf of the Government. I have evidence of this, but this opportunity has gone.

We must act now at once and set thinking and working for better ends. The best and only pathway is by greater unity—a league of photographers, without suspicion or fear of jealousy, but full of the spirit of optimism.—Yours very sincerely, Marcus Adams.

The Camera Club.

BRITISH LENSES: OTHER PHOTOGRAPHIC REQUISITES.

To the Editors.

Gentlemen,—All of us who would like to see British workers supplied with British goods will have welcomed Mr. Sinclair's challenging letter in the November "Photographic Dealer," and particularly that part of it in which Mr. Sinclair refers to lenses. I am in cordial agreement with Mr. Sinclair when he expresses the opinion—which in his case is more than a mere opinion—that British lenses are superior to those of Germany. I would even go further by saying that British opticians have been the pioneers in the post-Jena-glass era, as they were in the pre-Jena-glass era. But I think it must be recognised that Mr. Sinclair and anyone like myself are voices crying in the wilderness. Mr. Sinclair evidently confesses himself such a voice: had there been others of the same conviction he would surely have quoted them. But, no; the rank and file of photographers have succumbed to the German penetrating propaganda of German supremacy in optical matters, and I am afraid it will be a difficult business to destroy what has become a kind of tradition.

The first obstacle to that destruction relates to the optical glass used in the making of lenses. It seems to be a question if we are independent of Germany for that in the future. A leading optician whom I questioned on this matter about two years ago declared, with evident regret, that it would be necessary to employ glass from Jena when post-war manufacture was resumed. If that is so, then whatever lens-makers may do or say in recommendation of their finished instruments, there will always be wrapped up in every objective a species of testimonial to the Germans. I wish I could think that this dependence has been swept away, but no evidence that it has has come to light within my knowledge. America, so it would appear from reports in the technical Press in the United States, some of which, if I remember rightly, were from official sources, has made itself self-supporting in this important matter. Is it to happen that for key material our opticians are to rely on America? It is to be hoped not, for though in the manufacture of established types of instrument we here may still lead the way, progress in design is bound to be severely handicapped by dependence on another country for new types of raw material. The producer naturally feeds himself first before he passes round the spoon.

And then, to come to the finished lenses, we are in the unfortunate position of having no authoritative judgment, so to speak, by which to disperse the mass of prejudice in favour of the superiority of the Germans. Mr. Sinclair very properly cites the tests of the National Physical Laboratory. They are isolated cases: the whole number of lenses tested by the National Physical Laboratory is barely a score in a twelvemonth. And how many photographers are there who have ever heard of the National Physical Laboratory? The effects of its certificates may be appraised at zero compared with the mass effect of copious mentions of German makes of lens in photographic text-books and periodicals and the graphic evidence in the way of photographic reproductions put forward by the makers themselves. It comes almost to this—that the British optical industry is in the position of needing to create among photographers generally a feeling of faith in the superiority of its products, a feeling which is the counterpart of the knowledge of such superiority possessed by the few. I saw in a recent issue of the "B.J." a reference to the British Optical Instrument Research Association. I don't know what is the immediate programme of this body, but it might do worse than collect and publish in a popular and easily assimilable form the facts which establish the premier qualities of the manufactures of British opticians.

I find these notes have run to such a length that I must cut very short any reference to other photographic goods which are the subject of possible enemy competition. But surely it is desirable to know how makers of sensitive papers have got on in regard to the raw paper base, which before the war, I believe, was almost entirely German. It is obvious that technically during the war they have replaced it. But is that to say that in the event of supplies becoming available again from Germany makers can and will do without it? Many of us would like to be assured in the future, when we buy a British brand of bromide paper, that there is no proportion of enemy material in it.

I enclose my card, and beg to sign myself,—Yours faithfully,

DUBITANT.

CHEMICAL POISONING.

To the Editors,

Gentlemen,—No doubt some of your readers, and especially your correspondent "M. Q.," will be interested to learn of some conclusions which have been drawn from experience with chemical poisoning in the United States.

Usually the trouble commences with itching and local reddening of the skin, followed by swelling and the formation of water blisters, especially in the region of the nails and between the fingers, and in severe cases these blisters combine to form one large one encircling the entire hand. At this stage, with careful attention, the blisters subside, and in two weeks the skin begins to peel and the patient is well, though if the blisters burst raw sores are left which heal with difficulty, and there is danger from bacterial infection. With some patients the blisters appear on the feet and other parts of the body simultaneously with the appearance on the hands, which would indicate that the poison has entered the blood stream, causing general irritation.

In all cases it is advisable to consult a physician, as the condition of the health has an important bearing on infections of this nature. The usual treatment is that of elimination and healing, and absolute isolation from the developing solutions and other sources of contamination is imperative. No specific eliminant appears to have been discovered, the usual "cures" in the form of ointments serving merely to allay the inflammation. An application of zinc ointment, or the formula containing resorcin and ichthyol often recommended in the "B.J.," and bandaging of the parts affected is usually sufficient. After the skin has peeled, the parts affected are always supersensitive to the poison, so that special precautions must be taken in future. There is no ointment known which will prevent future attacks if the person is again exposed to the action of the chemicals which caused the poisoning.

There is some doubt among members of the medical profession as to whether the poison does enter the blood stream. In most cases the trouble is confined to the underlayers of skin on the hands, the chemical acting as a local irritant, though the fact that in the case of persons in factories who pack photographic chemicals in tubes and cartons, and who, therefore, breathe the chemical dust, the skin may break out in different parts of the body is strong evidence that the entire blood stream may become poisoned. In ordinary dark-room procedure the poison undoubtedly enters the skin by the way of cracks formed by chapping or roughening of the skin by the action of the alkali in the developer. If the developer or other chemical solution is then allowed to dry on the hand, the salts crystallise within the pores and cause the skin to crack further, exposing the under layers and rendering possible the access of the chemicals to the blood stream. A developer containing potassium carbonate is less liable to cause trouble, the deliquescent nature of the potassium salt preventing crystallisation within the pores. In the case of a developer like amidol, although this causes less trouble than an alkaline solution, the drying of the sodium sulphite on the hands has the effect of causing the skin to crack in the same way as sodium carbonate.

Although most cases of poisoning are classed as "metol poisoning," almost every photographic developer will cause trouble with the right person, and in this respect the personal element plays an important part. In the factories where photographic developers are manufactured newcomers appear to be particularly susceptible, and an employee should be transferred to some other occupation if poisoning symptoms appear. Persons with very thin skins are particularly liable to be affected. Metol takes first place among developers as regards severity of action, though cases of poisoning have been known where the person handled paraminophenol or pyro exclusively. On the other hand, some persons susceptible to metol are immune to amidol or paraminophenol.

The mode of access of the poison being known, preventive methods at once suggest themselves, and may be tabulated:—

(*a*) Never let the developing or other chemical solution dry on the skin, so that if solutions are being handled intermittently it is better to keep the hands thoroughly wetted rather than dry them after only imperfectly washing them.

(*b*) When washing the hands, wash for two or three minutes in hot water until all soapy feeling disappears, otherwise the chemicals left within the pores will crystallise and cause cracking of the skin. The reason why most poisoning is caused by developers is because it is difficult to remove alkali from the skin by washing, especially if it is at all cracked. By bathing the hands in a weak acid solution, say, 1 per cent. acetic acid, or by immersing them in the acid fixing bath before washing, the alkali is neutralised and the salt thus formed is more readily removed by washing.

(*c*) The use of a thin coat of vaseline on the hands will assist in preventing access of the solution within the pores of the skin, while rubber gloves, if used at an early stage, are an almost certain preventive.

The usefulness of the above simple precaution is shown by the fact that during the instruction of over 5,000 students at the U.S.A. School of Aerial Photography, Rochester, N.Y., only a single case of chemical poisoning was reported.

That so few chronic cases of chemical poisoning are heard of in this country may be explained by the fact that the average person turns to some other occupation immediately he finds himself sensitive to photographic chemicals.—Very truly yours,

J. I. CRABTREE.

Research Laboratory, Eastman Kodak Company,
Rochester, N.Y., November 21.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

C. H.—By writing the Secretary, Polytechnic School of Photography, Regent Street, London, W.1, you will probably be able to arrange for postal lessons.

G. S.—The article appeared in the January issue of the "Professional Photographer," which, no doubt, is still obtainable from the publishers, Messrs. Kodak, Ltd., Kingsway, W.C.2.

CHROMIUM STAIN.—Can you tell me in your next issue how to remove the stain of photographic crhomium intensifier from a light grey suit? It is quite a small stain, yellow in colour.—O. P.

Try metabisulphite solution; but it is doubtful if anything will remove it.

O. N.—It is easy to obtain very soft results by using artificial light, and, with proper diffusing arrangements, almost any form of electric light will answer very well. Three 1,000 c.p. half-watts would make a very good installation, but the ordinary Osrams would be useless as the light is too yellow.

L. W.—We are sorry we have no list of the Mazo lenses, but the lens is evidently one of the R.R. type of aperture, probably f/8, but certainly not more than f/5.6. If it is about 8 or 9 inches focal length, its value is not more than about £1, proportionately less or more, according as the focus is less or more than this figure.

B. T.—Your lens is an old Series 3A of *f*/9 aperture, and not manufactured by Zeiss for many years past. In the list we have we see that the shortest focal length is 4⅞ ins., but if you correctly quote its focal length as 95 mm. this must be a shorter focus of 3¾ ins. We should say the value of the lens at the present time is not more than a pound.

J. W.—The stains have the appearance of imperfect fixation. With present-day papers you should make it an invariable rule to wash two fixing baths in succession. Any imperfect action of the fixing bath is likely to be aggravated by using an alum bath after it unless you wash thoroughly between the two. If you must harden the prints, we should advise you to make up the fixing-hardening bath such as one of those in the "Almanac."

W. S.—The question is a very wide one, and in the absence of details we would refer you to an article by "Practicus," which appeared in our issue of October 26, 1917. A previous article on studio lighting also appeared in the Journal of March 30, 1917. Our publishers can supply both these numbers, price 4½d. each, post free. If there are any specific questions, however, on which we can give you any advice we shall be pleased to help you.

A. B.—You will find no difficulty in using half-watt lamps if you have been accustomed to arc or mercury vapour. It is better to have several 1,000 c.p. lamps instead of one large one, as so much light is not then wasted in diffusing it. We have found ordinary calico to be the best diffuser, and it is advisable to have the lamps made to raise and lower. We have not yet seen the Mazda "Blue" lamp, so cannot speak of it. The kind generally used is the "Atmos" type issued by the General Electric Co. An important point is to see that the lamps are run at their full voltage, as a drop of even 10 volts greatly increases the exposure.

D. G.—(1) You require an accessory for illuminating the negative in the shape of a curved reflector which you can place to the rear of the camera. Messrs. Lancaster, 87, The Parade, Birmingham, and Messrs. W. C. Hughes, 82, Mortimer Road, Kingsland, N., make such reflectors for use with gas. (2) You require a battery of 20 incandescent burners. Lamps of this type are supplied by Messrs. Griffin, Kemble Street, Kingsway, and by the Kodak Company, Kingsway. (3) Messrs. Marion and Co., Soho Square, W.1, or O. Sichel and Co., 52, Bunhill Row, London, E.C. (4) We do not know makers of the ordinary pattern paraffin lamp, but paraffin mantle lamps are made by the Kitson Empire Lighting Co., Stamford, Lincs., and Blanchard Lamps, Ltd., 151, Farringdon Road, E.C.

C. J.—So far as we gather from your letter and the memorandum in reference to half-watt lamp, you are asking us whether you can avoid the veiling of the background by modifying the enlarging arrangements. We do not see that there is any reason to think that you can improve matters in this respect. We suppose that there is no stray white light in the dark-room when making the enlargement. Your best course to reduce the veil would be to add a little more bromide, or, in the case of the amidol developer, to try the effect of a little soda bisulphite or potassium metabisulphite. This will slow development, but it may have some benefit on the background, but probably your best practical course is to over-develop slightly, and then to clear up the background with weak iodine-cyanide reducer applied with cotton-wool. This latter is the regular practice in dealing with this class of print.

The British Journal of Photography.

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The Summary of contents which usually occupies the lower half of this column will be found at the foot of the page overleaf and will continue to be placed there whilst its regular position is required for notices relating to the forthcoming "B.J. Almanac."

Words and Phrases.

Photography in the course of its growth has evolved some curious terms for some of the things and processes connected with it. We confess that we are in ignorance of the origin of the term "dark slide," and should have no regrets if so undescriptive a name were to be ousted, as it is in process of being by the modern term "plate-holder." But there are other misnomers more insidious in character, and on that account more likely to puzzle those newly coming into photography. Take "exposure meter," which the initiated accept for what they know it to be, ut which the stranger in our processes must think to be ome device for measuring the time during which a plate is xposed. "Changing box" and "changing bag" have heir respective precise significations which may perhaps e guessed if you did not happen to know them; but try he less informed person with "extension adapter," oil print," or "extra-focal length," and see what he ould make of them.

Something in the nature of a key to the many words nd phrases which occur in photographic text-books and eriodicals is a thing which should need no apology. is, in fact, provided in the forthcoming "British urnal Almanac" in the shape of an article which ates these meanings succinctly and clearly and co-lates them with like terms with which they are more less closely associated. It may be thought that, in dition to fulfilling its primary aim of providing a ference chapter for the beginner, this feature of the lmanac may prove itself of commercial service to some its foreign readers ordering goods from Great Britain d imperfectly acquainted with their exact trade ignation.

EX CATHEDRA.

The "B. J." Index. With next week's issue of the "British Journal" will be presented the indexes to the contents of the 1918 volume and to the "Colour Photography" supplement. Like those of preceding volumes during the latter period of the war, they are distinguished as much by notable omissions as by items which figure prominently in them. Of these latter we are glad to think that we have seen the last during the lifetime of the present generation. We refer to the proceedings against individuals under the Defence of the Realm Act for photographing, and more particularly to the reports of appeals under the Military Service Acts before the various tribunals. The items which have been conspicuous by their absence, chiefly notices of new introductions in the way of apparatus and materials, will, we hope, begin to appear in the forthcoming volume, as manufacturers are relieved of their war activities and are enabled to devote their normal energies to the design of new goods. In optical and chemical manufactures we shall doubtless witness progress as a result of conditions dictated by a state of war, and if the effect may be less marked in respect to cameras and similar apparatus we shall expect to see evidences of a fresh view in the design of these articles, and of plans for the supply of distant markets which await the goods of British manufacture. And thus at this change-over moment we may express something in the nature of a vote of confidence in the British photographic trade which, in surviving the troubles of the past four and a-half years, has demonstrated its capacity for the great opportunities of the future.

* * *

Light-Filters. Few photographers realise that a light-filter may have a decided influence upon the definition of the lens, and more particularly so if the latter instrument is of long focus and works at a large aperture. We have known photographers for the sake of economy buy filter films unmounted, and do the mounting operation themselves instead of paying the extra price for a filter properly mounted in optical flats. It is to be pointed out that it is not sufficient simply to examine a piece of glass in the hand with a view to finding out if it is reasonably free from flaws, which, in fact, may really do far less harm to the definition of the image on the plate than would the glass itself, if the latter is in the optical sense "untrue." If the glass is not what is termed "optically flat parallel" then we may really be adding a further lens to our existing instrument, may entirely upset its optical corrections, and produce a very bad effect upon its definition, particularly if the lens is of long focus, as in the case of a tele-objective. The only safe way to avoid impairing the best definition that it will give is to use a filter mounted in the proper "optically flat" glass and enclosed in a proper screw-in cell. When we consider that this glass has to be worked by hand until its condition is such that its addition to the lens has no effect upon its focus or definition, it is easily understood that such glass cannot be sold cheaply, but it is well worth the increased price to have a filter properly mounted. Photographers will ungrudgingly give large sums for their lenses in order to have instruments of the highest quality and defining power, and yet when it comes to fitting a filter, for the sake of supposed economy employ one that may impair to a serious degree the finest qualities of the lens. Without doubt in such cases it is best to use the unmounted gelatine filter film slipped between the components of the lens. The disadvantage of this course, however, is that the film is easily spoiled by over much handling, or by undue exposure to a damp atmosphere without proper protection.

* * *

Halation. Many otherwise good negatives are spoilt during the course of a year from halation, and many others entail much after-work through this defect and produce only passable prints. The practice of using all plates backed is not so common as it was a few years ago, and certainly for ordinary subjects a backed plate is not worth the slight extra expense and trouble involved. But in all cases where the picture contains bright points of light and deep shadows, not to use a properly backed plate is to neglect a valuable means of perfection. It is claimed by some workers that in the "self-screened" type of orthochromatic plate the dyed screen of which is incorporated in the emulsion absorbs all light before it reaches the glass support, in this way making the plate almost entirely non-halative, but when dealing with difficult interior subjects, such as those which contain clear glass windows directly facing the lens, we have not found these plates so satisfactory as those of the ordinary kind properly backed, though there is a slight improvement in freedom as regards halation over an ordinary unbacked plate. It must not be thought, however, that for the most difficult subjects of the kind mentioned above backing is a complete preventive, although with plates provided with a good backing halation will be reduced to its lowest possible degree. In actual practice we have found that backed panchromatic plates are almost entirely free from any tendency to halation. While making a set of negatives for the Paget colour process a year or two ago we never noticed any sign of this trouble. On occasions when difficult work has to be done film has a decided advantage over plates, and commercial photographers might advantageously make more frequent use of film than they do.

ENLARGED NEGATIVES.

Although the general adoption of bromide paper for enlarging has greatly reduced the necessity for enlarged negatives, there are still many occasions on which they are indispensable, all processes of contact printing, such as carbon, platinum, P.O.P., or oil printing, being only possible from a full-sized negative. Even for bromide or gaslight prints in quantities the enlarged negative may facilitate production when compared with the operation of enlarging direct from the original small plate, and there is the further advantage that a considerable improvement in quality both by means of judicious exposure and development of both the transparency and negative may be made, as well as the possibility of working up by hand if the original needs it.

As is generally known, the first step is to make a transparency from the original negative, and this may be done either by contact or in the enlarging camera to the necessary size. The former is the easier and cheaper, but the latter gives the best results. As the procedure is nearly the same in both cases, we will deal with the small transparency method first. Having carefully cleaned and, if necessary, spotted the negative, it is placed in a printing frame, and a slow fine grain plate placed in contact with it, film to film, the greatest care being taken to remove all particles of dust, which would cause small transparent spots in the positive and large opaque ones in the finished negative, the latter being difficult to remove. As most plates are slightly concave upon the coated side, it is advisable to expose to a small source of light at a distance of several feet and to keep the frame quite still to avoid diffusion by parallax. The exposure should be on the full side and development carried on until the density is that of a rather thin negative. There should be no clear glass, or the enlargement will probably be too hard. Lantern slide quality is not the best for enlarging from. It is obvious that at this stage considerable modification of the character of the image is possible. By suitable exposure and development a soft thin transparency may be made from a hard, dense negative, or a vigorous one from a thin negative. Intensification or reduction may be used if needed, and after drying and careful spotting the transparency is ready for enlargement. It is, as a rule, unwise to attempt to do anything in the nature of retouching or working up upon either the negative or transparency, as every touch is magnified and the work looks very coarse; such work may all be done upon the large plate. Most text-books recommend the use of a camera with a bellows both before and behind the lens, the one end being fitted with frames to hold various sized transparencies and the other carrying the ordinary focussing screen and dark slide. As such cameras now rarely form part of the studio equipment, it will usually be found more convenient

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SUMMARY.

A note on the annual index to the "B.J.," with comments on what will disappear from it in the future and what it is hoped will reappear, will be found on page 565.

In the concluding portion of the Traill Taylor memorial lecture on the Interferometer, Mr. F. Twyman deals especially with testing and modifying photographic lenses. (P. 567.)

The question of the influences of backing and dyeing the films of plates, and also the use of celluloid films for the avoidance of halation, is dealt with on page 566.

Few photographers avail themselves fully of the advantages of light-filters. A note on page 565 gives some hints on the selection from an optical point of view.

Many workers meet the difficulty of making enlarged negatives by sending the job to a trade house. We point out how this work may be cheaply and easily done with ordinary apparatus. (P. 566.)

A report of proceedings against two canvassers who had made unauthorised use of the name of a well-known photographer appears on page 574.

Assistants' Notes is devoted to an exhortation to the assistant to specialise in some branch of work, and not to be content with the status of a good all-round man. (P. 571.)

A list of lectures to be delivered shortly before the Royal Institution, several of which are of interest to photographers, will be found on page 575.

Copyright, stage photography. chemical-proof dishes, fire-proofing muslin, and enlarging apparatus are among the subjects dealt with in "Answers to Correspondents." (P. 576.)

We regret to record the death of Mr. W. Green, of Berwick, whose cloud negatives were well known to all landscape photographers. (P. 574.)

Engineering photography as a means of preventing waste of labour in working up faulty castings, and the commercial use of X-rays are the subject of correspondence on page 574.

A method of obtaining a pair of stereoscopic pictures simultaneously, using only one lens, a self-winding spool and a microscope cinematograph are described under patents of the week. (P. 572.)

to put the transparency in the ordinary enlarging lantern and to project the image upon an ordinary slow plate instead of upon bromide paper. As even slow ordinary plates are much more rapid than bromide paper, it is desirable to make a strip test exposure upon a small plate placed so as to receive the densest part of the image. Ordinary drawing pins will serve to fix this on the large plate in any desired position. When putting the transparency into the enlarger it should be remembered that it is as easy to make a reversed negative for single transfer carbon printing as it is to make a non-reversed one, as we have only to put it in with the glass side towards the large plate if the former be desired. Development and fixing are, of course, conducted as usual, and when finished the negative is ready for retouching or any other "making ready" for printing.

If we decide to adopt the large-transparency method we put the small negative into the enlarger and make our positive upon a slow plate in the same way as just described, remembering to keep the same quality as would be needed for the small one. The large positive may now be retouched and "faked" to almost any extent; pencil and knife upon the film and matt varnish or tracing paper with soft pencil, blacklead and stump or water-colour upon the back may all be done. When judged satisfactory the finished positive is put in a printing frame, and the final negative made by contact upon a slow plate. This in its turn may be further worked upon before passing to the printer.

In view of the great cost of large plates it is well not to forget that for most subjects a smooth thin bromide paper may be used for the final negative, the grain not being noticeable if no attempt be made to render it transparent by oiling or varnishing. The printing will be somewhat slower if the paper be left as it is, but the prints will not only be less granular but brighter. Paper negatives are ideal for working upon, as either front or back will take pencil or chalk to any extent, and for carbon work they may be printed from either side.

Those who possess a knowledge of the carbon process will do well to produce their small transparencies by its aid as they will be absolutely grainless and full of detail in the shadows. Instead of using the ordinary temporary supports the image is developed upon plain glass which has been coated with a substratum of gelatine hardened with chrome alum and allowed to dry. When working with enlarged transparencies the final negative may be made in carbon. Transparency tissue which contains a double quantity of pigment should always be used, or the images will be too thin.

With very granular originals it is often advantageous to use a soft focus lens for enlarging, only a small degree of diffusion being needed. If, say, a Dallmeyer B or D lens be used about one-half to one turn of the adjustment it will destroy the grain without causing the image to appear unsharp. Some single lenses will also give the necessary diffusion if used at an aperture of $f/8$ or larger.

It is obvious that even the cheap fixed focus enlargers or "printing boxes" may be used for the production of enlarged negatives as well as for ordinary paper prints. The transparency is placed in the negative carrier, and the plate in the position usually occupied by the bromide paper, or, if there is not enough depth for this, a flat "Portrait" film may be used. A variation may be made by making a large transparency on film, and from this a negative by contact on another film.

ON THE USE OF THE INTERFEROMETER FOR TESTING OPTICAL SYSTEMS.

(The Twenty-first Annual Traill-Taylor Memorial Lecture.)

(*Continued from page 557.*)

When the mirrors are properly adjusted interference bands are seen which form a contour map of the aberrations, measured in wave-lengths of light, of the beam which has passed twice through the prism. This map is at the same time a contour map of the glass requiring to be removed from the prism face in order to make its performance perfect—hence the value of the instrument as an aid to retouching.

Fig. 3 (the lens interferometer).—In the lens interferometer all parts are left as in the prism arrangement, except that the prism L and the mirror F in Fig. 2 are removed and replaced by the lens and mirror mount shown in Fig. 3. T represents the lens under test, U a convex mirror in such a position that it reflects back along their own paths the rays received from T. The mirror U can be moved by a screw motion actuated by the handle V, so that its distance from T can be varied at will. It will be seen that when the adjustment of this part of the apparatus is correct, the whole lens addition will, if the lens T be perfect, receive the beam of plane wave front and deliver it back again with a plane wave front. If it does not do so the departures from planeness to the so delivered wave front will form a contour map of the wave front, and therefore of the corrections which have to be applied to the lens in order to make its performance, when in actual use, perfect.

Figs. 4A and 4B represent in diagram a typical map. The procedure in such a case would be to mark out the contour lines on he surface of the lens with a paint brush, and then to polish first on he part of the lens which is too high, subsequently extending the rea of polishing first partly, then wholly, to the next contour line, and so on. The marking out of the lens surface can be done while observing.

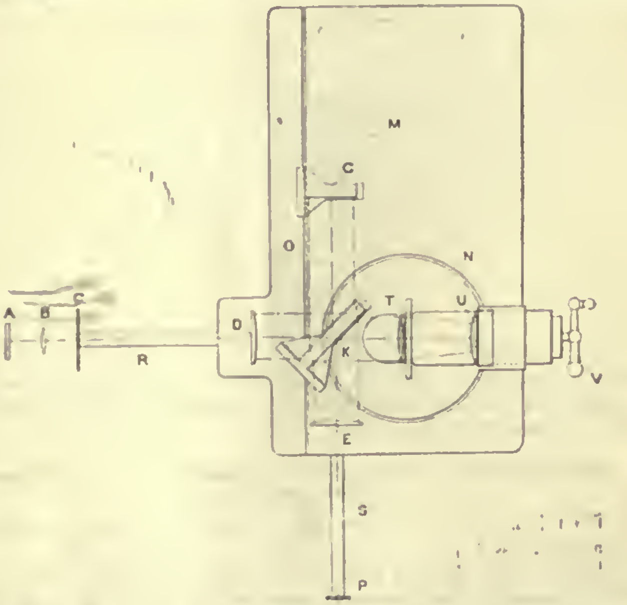


Fig. 3.

It should be noted that variations in the contour lines are obtained by a tilt of the plane of reference. Thus a slight adjustment of the mirror G (Fig. 3) might change a contour map from that shown in Fig. 4A to that shown in Fig. 4B.

The form of surface is in each case the same (*see* the sectional diagrams of the wave front at the top of the figures), but correction can be carried out according to whichever plan of reference is the most favourable from the point of view of the operator. In order to find whether a point is on a hill or a valley on the glass, the cast-iron table M (Fig. 3) can be bent with the fingers so as to tilt the mirror F in such a way as to lengthen the ray path. If the contour lines around the point expand to enclose a larger area, a hill is indicated, and vice versa. Although the words "hill" and "valley" are convenient to use, it must not be supposed that the imperfections necessarily result from want of accuracy of one or more surfaces of the lens. The contour map gives the total effect on the wave front produced by double passage through the lens or prism, and shows in wave-lengths the departures from planeness of the resulting wave surface.

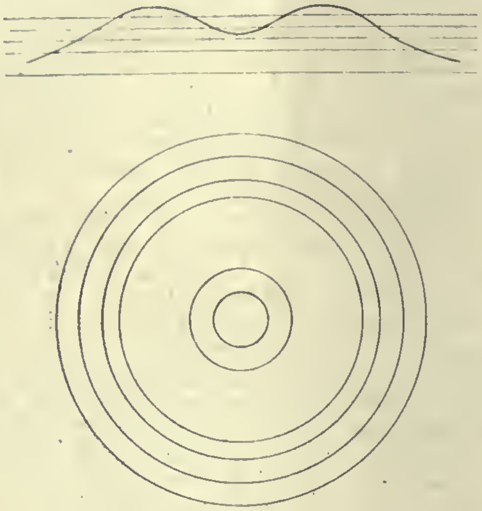


Fig. 4a.

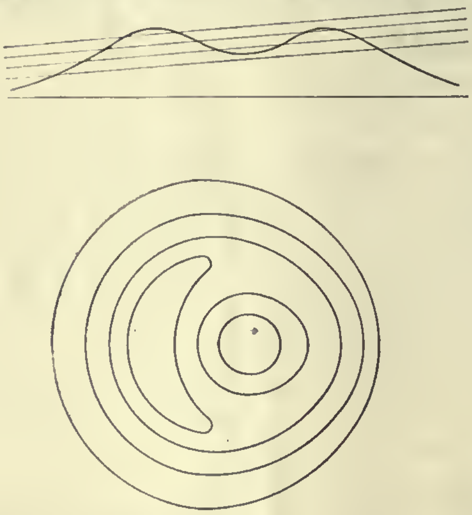


Fig. 4*b*.

Description of Results Obtained with the Lens Interferometer.

We will now look at a few photographs taken on the lens interferometer.

Fig. 5.—This shows a lens "out of focus." The emergent wave front instead of being plane is spherical. It should be noted that in every case the aberrations are doubled by the interferometer, since the light passes twice through the lens.

Fig. 6.—The same lens almost exactly in focus, but in order to reveal the structure the interferometer mirror has been slightly tilted. If the lens were perfect, and perfectly in focus, the bands would be straight. The focussing and tilting of the mirror can all be done by the observer while he is watching the effect, and takes a few seconds only.

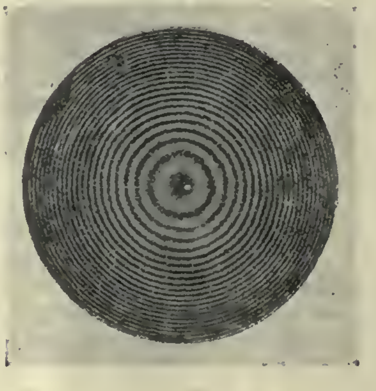


Fig. 5.

Fig. 7 shows the same lens tilted sufficiently to produce astigmatism—this is evidenced by the bands being elliptical in shape. The lens is "out of focus," the bands are therefore numerous.

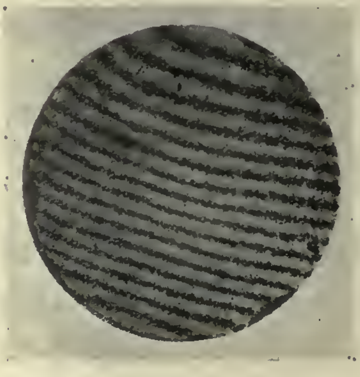


Fig. 6.

Fig. 8.—The same lens has now been tilted sufficiently to show distinct coma in the image. It will be seen that over the major part of its aperture it is producing an almost accurate wave front. But the wave front of the remainder of the surface curls over rapidly. We now see how it is possible to remove coma over a fairly wide field in the case of a simple achromatic object glass by placing a diaphragm at a suitable distance from it. Knowing the tilt of the lens and its dimensions, we could obviously in a few minutes, with pencil and drawing paper, say precisely how large

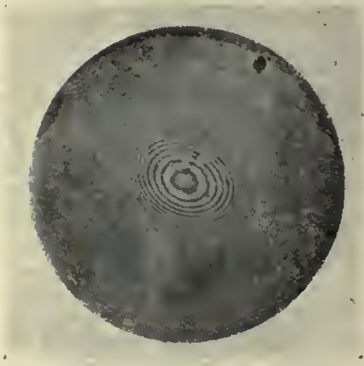


Fig. 7.

such a diaphragm could be with advantage, and where it should be placed.

Fig. 9.—This shows the effect of placing in the path of the light a glass plate which has a vein in it.

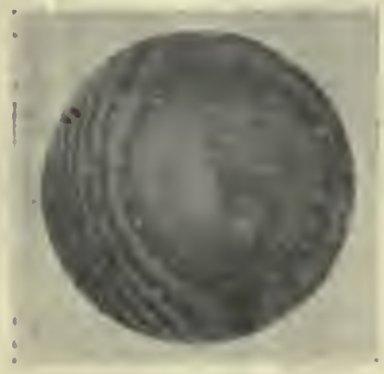


Fig. 8.

Fig 10 shows the effect of interposing in the path of the light a piece of sheet glass of quality better than ordinary window glass but worse than plate glass.

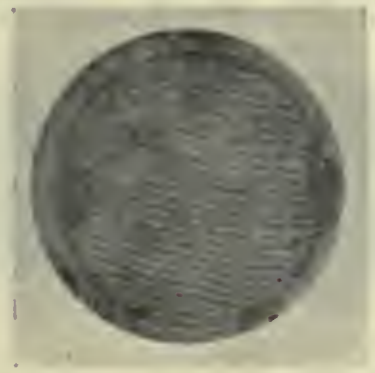


Fig. 9.

The Camera Lens Interferometer.

You will have noticed that up till now we have been dealing with axial pencils only. An apparatus which will only test for axial pencils is of course of little use for the testing of camera lenses,

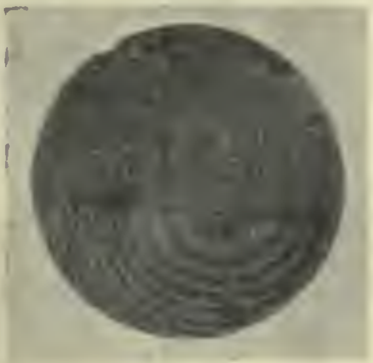


Fig. 10.

and for camera lenses I have designed a special form of interferometer. This instrument differs from the ordinary Hilger lens interferometer in that the lenses can be tested for oblique pencils. The modifications essential for this purpose are as follows :—

1. Means of oscillating the lens about a line at right angles to the axis and pasing through the second principal point.

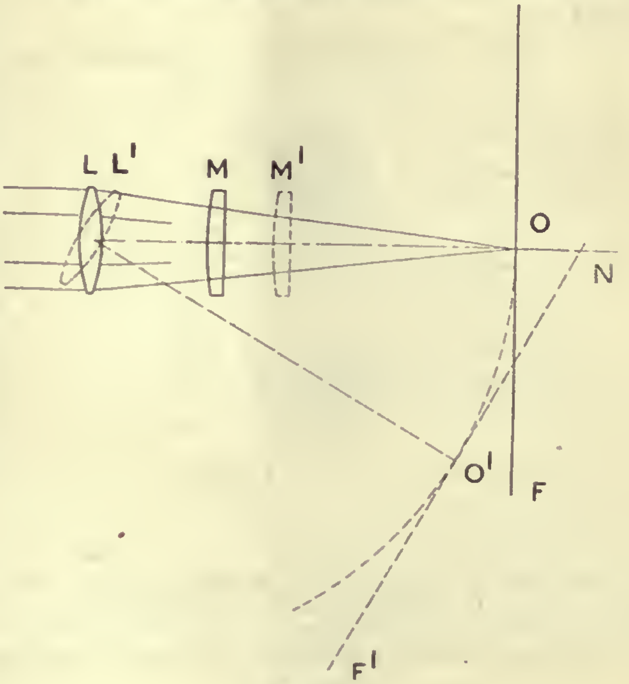


Fig. 11.

2. Mechanism whereby, simultaneously with the above oscillation of the lens, the convex back reflecting mirror is automatically moved away from the lens in such a way as to correspond with the focal plane in which the lens is desired to form its image.

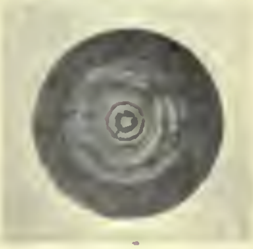


Fig. 12a.

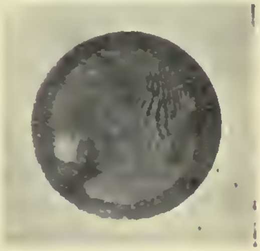


Fig. 13a.

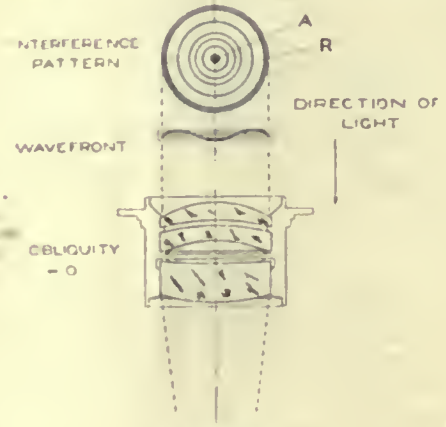


Fig. 12b.

Fig. 11.—Thus, in Fig. 11, L, M, and OF represent the relative positions of lens, back reflecting mirror, and focal plane, in the case

of an axial pencil; and L′, M′, and O′F′ the corresponding positions for an oblique pencil; then the mechanism must be so erranged that—

$$MM'=ON.$$

The lens under test is so mounted that it can be adjusted in position both along and at right angles to the axis by means of adjusting screws. In this way it can be so adjusted that its second principal point is on the axis of rotation. The rotation of the lens can be effected during observation of the interference pattern.

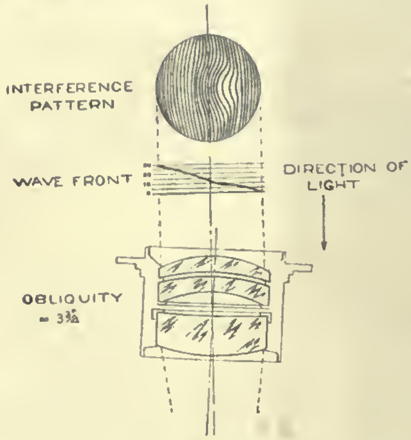


Fig. 13*b*.

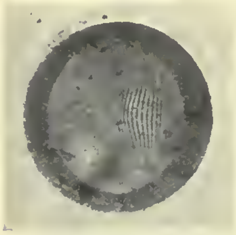


Fig. 14*a*.

Fig. 15*a*.

Such, briefly, is the principle on which the camera lens interferometer is constructed.

Results of Tests with Camera Lens Interferometer

We shall now examine some of the results obtained on it. It will be most instructive to consider one lens in some detail.

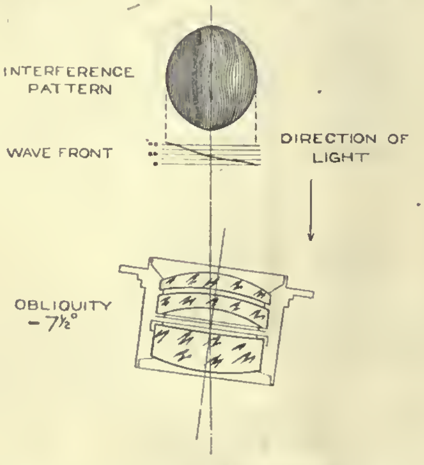


Fig. 14*b*.

The lens is a camera lens made by a maker of high reputation, and I believe it to be as good as any existing lens of the same aperture and focal length. Its aperture is f/3.5, and focal length 7·5 cm., and it is recommended as covering 3 by 3 cm. at full aperture. All the photographs are taken with full aperture.

I ought, perhaps, to point out that the camera lens shown diagrammatically in Figs. 12B, etc., is not intended to resemble that under test.

Fig. 12A shows the wave front after passage through the lens of an axial pencil; diagram 12B shows the shape of the wave front on a diametral section. The aberration is the type generally called spherical aberration.

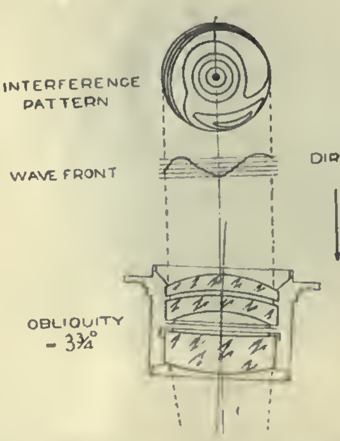


Fig. 15*b*.

Fig. 13A.—This represents the effect of an oblique pencil at 3½° to the axis, which corresponds with a point ½ cm. from the middle of the photographic plate. Diagram 13B shows the shape of the wave front.

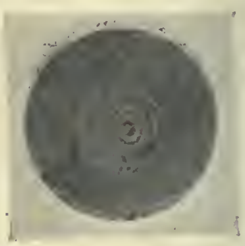


Fig. 16*a*.

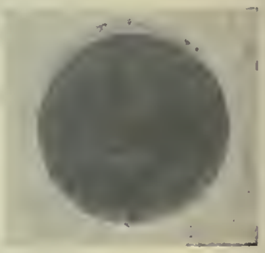


Fig. 17*a*.

Fig. 14A.—The lens is here at 7½° obliquity, corresponding with 1 cm. from the middle of the plate. In this case and also in the preceding one it will be seen that the wave front is marching towards a point a little to one side of the ideal position. This is the effect which would be given by what is usually called distortion, although in this case it is due to faulty adjustment of the apparatus. It will be seen, then, that this interferometer gives an accurate measure of distortion. But, as I have said, in this instance the

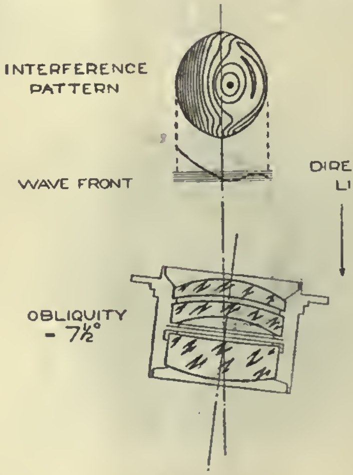


Fig. 16*b*.

effect is due to the lens being imperfectly adjusted; the fault being that the lens is not rotating about its second principal point. We will therefore readjust our interferometer and look at the lens again.

Fig. 15a.—The appearance for the axial pencil is the same as before. In Fig. 15 we have returned to 3¾° tilt, having effected the readjustment I have just referred to. It will be seen that although the spherical aberration is still present the errors are otherwise not much greater than for the axial pencil. But asymmetry is already commencing.

Figs. 16a and 16b.—Here the lens is at 7½° tilt. The asymmetry is much more pronounced. Figs. 17a and 17b show the effect at 11¼° tilt. It is now obvious that the lens still requires adjusting longitudinally to do it justice—it is still not rotating about its second principal point, although very nearly so; quite nearly enough for purposes of preliminary testing.

We will now return to Fig. 12, which represents the best focus obtainable with an axial pencil, in order to see how far this lens is from perfection for a point on the axis. Counting from the centre we see there are 4½ wave-lengths of aberration—that is the wave front after passage once through the lens would have an aberration of 2¼ wave-lengths. Applying Lord Rayleigh's rule, we see that the aberration is 8½ times that permissible for a first-class lens.

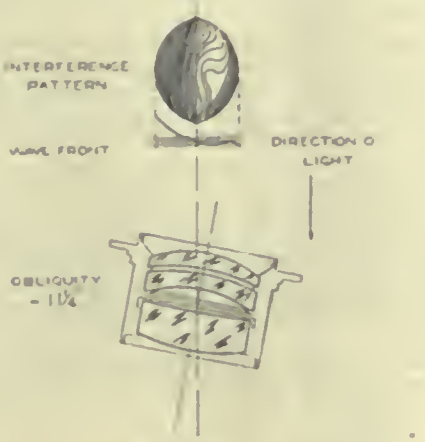


Fig. 17b

Can we correct this aberration? Most assuredly, by the simple process of polishing off the high parts of the glass—not at all a difficult or very lengthy operation, and one which I have performed this morning, before my usual breakfast hour, on a very similar lens. But what about the aberrations for oblique pencils? I have not yet had an opportunity of carrying out the complete operation of correcting a photographic lens for oblique pencils, but I am very hopeful that in the case of the lens just examined a very great improvement could be obtained in the definition of oblique pencils simultaneously with complete correction of the aberration for the axial pencil. The process appears to entail a correction both of the front and back surfaces of the lens.

I have to thank you for the patience with which you have attended to what I fear is a rather dry subject. I hope I have succeeded in leaving with you the impression that perfection in photographic lenses is not yet attained, but that great improvement may be immediately attainable.

I must not, however, close without acknowledging the great assistance given me in the development of these instruments by Mr. Alfred Green, chief optical foreman in the workshops of Adam Hilger, Ltd.: who in addition to giving most valuable suggestions has with his own hands worked the necessarily very accurate mirrors. I must also very heartily thank Mr. O. Klein, who has, under very distressing pressure of time, very patiently and skilfully taken all the photographs of aberration effects I have shown.

F. Twyman.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

What of the Future?

Despite all the war-time recruits into the ranks of photography the photographer who is about to return from the seat of war has nothing to fear if it happens that he is a skilled man. With the probable falling off of the boom in business and consequent necessity of raising productional quality to pre-war standard skilled labour and better material for this object will be much sought.

Owing to numerous reasons the middle and lower-class labour market will become congested in the not far distant future—therefore the assistant who possesses special or superior abilities should avoid seeking engagement with studios who employ this class—otherwise his remuneration and his abilities will suffer; the employer who is satisfied with any assistant who can merely make a negative or a print is of no use to the skilled man who loves his work and expects adequate remuneration for its successful cultivation and advancement.

There is little doubt that a number of high-class firms have employed a proportion of mediocre labour, but this has been due to force of circumstances rather than to choice, and, so soon as skilled labour is available, these firms will be anxious to re-organise their staffs for the purpose of "tuning up" their businesses in order that their productions may equal pre-war standards.—Q.

The "Skilled" Man.

Therefore, everything considered, it behoves the really advanced assistant, who, perhaps, is thinking of returning to civil life, to consider his plans for the future; he should make an analysis of his past experience and determine in which branch of work he is likely to make good. The writer, who is a very firm believer in specialisation and individuality, would recommend the photographer to seek to perfect himself to the utmost of his special ability. It is really remarkable how many so-called "bromide-printers" one may come across who know really very little about their particular work; the same applies to most other departments such as negative and print retouching, aerography, the study of colour, the techniques of parchromatics, and so on.

In any of these fields there is immense scope for specialisation—or the assimulation of rare and expert knowledge and ability—combined with opportunities of much higher remuneration and more settled berths than is ordinarily possible by those who are simply "good all round."

Admittedly, the demand for workers with the necessary abilities mentioned are not in the majority—but the supply is not equal to the demand.—Q.

No Royal Road.

There is no "Royal Road" to the acquirement of super-ability—fortunately, perhaps—but the use of sense and continued practice will always betray to the observant worker which kind of work he enjoys and is likely to excel in. Any trouble, labour, or expense entailed will be repaid again and again after the attainment of the desired end and, even then, a worker who takes pride in his attainments should always feel that he is still out to do bigger things.

The acquirement of a special skill is a bigger undertaking than one can be expected to achieve during ordinary business conditions—especially if one desires to study on an intensive course. If the proposed line of study is technical the writer advises the fitting up of a small laboratory and dark-room at home; if artistic one must possess the necessary equipment for private use and every source of artistic intelligence must be consulted and copious notes made for future reference. Ultimately, concentration on practical business work should lead to perfection with the passing of time.—Q.

Messrs. Jonathan Fallowfield, in common, no doubt, with many other firms in the photographic trade, are closing their premises from Tuesday afternoon next, the 24th inst., until Monday, the 30th inst. Mr. F. W. Hindley in making this intimation to us, kindly sends us a reproduction of the roll of honour of employees of his firm who have fought in the war. The roll numbers fifteen, two of whom have been killed in action.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications. Nov. 18—Dec. 7 :—

Cinematography.—No. 19123. Cinematography apparatus. H. H. and S. H. Moon.

Cinematography.—No. 19,806. Cinematograph cameras. H. C. Brown.

Cinematography.—No. 19,607. Cinematographic apparatus. Establissements Cantinsouza Soc. Anon.

Lantern Slides.—No. 20,129. Lantern slides. J. W. Barber.

Cinematography.—No 20,130. Portable cinematographic apparatus. J. W. Barber.

Colour Photography.—No. 19,868. Production of colour photography in natural colours in the film. H. C. Brown and R. Wellesley.

Music Type.—No. 20,114. Photographic music type and methods of producing sheet music therefrom. T. F. Gayner.

Cinematography.—No. 20,204. Kinematograph shutters. E. E. Halford.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Stereoscopic Photography.—No. 120,104 (Nov. 2, 1917.) The invention has for its object to provide improved means for producing stereoscopic effects in monochromatic photographs. It has heretofore been proposed to produce photographs with a lens having two diaphragms each with an aperture therein, so that two separate apertures are provided through which the light rays pass for producing the desired photograph. The complete lens illustrated at Figure 1, 2 and 3 is of known form and construction, having a milled edge on the ring *a* whereby the diaphragms are operated. In the example shown, the ring is internally toothed to operate simultaneously two iris diaphragms indicated at *b* and *c* mounted in an opaque screen *d*. The screen and iris diaphragms provide and control two view points on the one lens. There are also preferably provided lens shades *e*, *f*, corresponding in radial position to the two iris diaphragms *b*, *c*. The view points may be in a horizontal, vertical or inclined plane. In the Figure 4 arrangement, two disc type diaphragms *g*, *h*, one at each end of the complete lens, the discs being held in place by spring-like elements *i*, which hold the disc in position when the lens is adjusted in the ordinary way for focussing purposes. Figure 5 is an end view of the diaphragm *g* and its spring holder *i*. In this example, the iris diaphragm of the ordinary lens is not employed, but the aperture of each of the view points is varied by inserting rings having holes therethrough of varying diameters in the lens shades *e*, *f*. Herbert Sherrocks, 199, Brunswick Street, Chorlton-on-Medlock, Manchester.

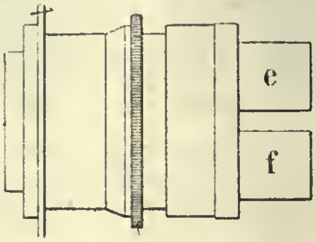


Fig. 1.

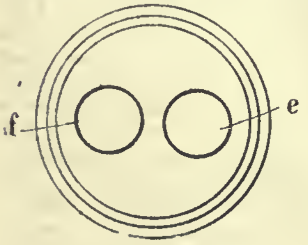


Fig. 2.

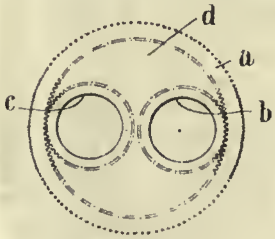


Fig. 3.

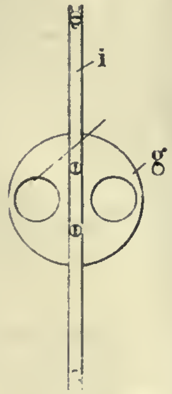


Fig. 5.

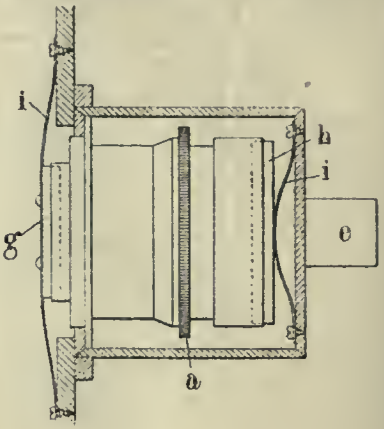
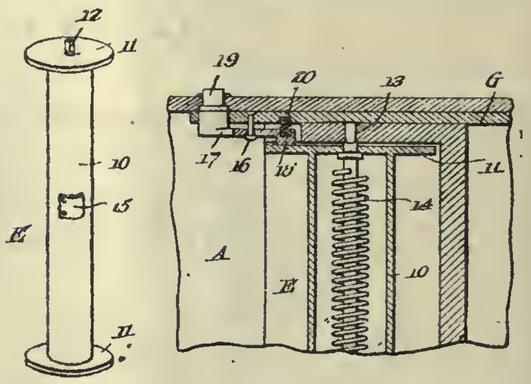


Fig. 4.

Self-Winding Film Spool. No. 120,273 (November 8, 1917).—The invention consists in a spring film-spool in which film as sold is coiled and which is adapted for insertion in the camera. In course of making exposures the film is wound off by hand into another spool, and when the whole film has been exposed it can be automatically re-wound upon the original spool.

The film-winding spool is in the form of a cylindrical or tubular barrel 10 having the end heads 11, and passed centrally through these heads is a shaft 12 which rotatably supports the winding spool, the ends of the shaft 12 being designed for detachable engagement in suitable grooves 13 formed in opposite walls of a film carrier G which is insertable within the rear end of the body A of the camera and is of the ordinary well known construction. It is of course understood that the barrel 10 is loose upon the shaft 12 for free rotation thereon and has interiorly thereon a coiled winding and unwinding spring 14 which surrounds the shaft 12 and has one end fixed thereto, while its opposite end is fixed to the interior wall of the barrel 10, the spring being normally unwound when the spool is placed within the camera and carrying the unexposed film with its protective covering constructed as usual. On the placing of the spool E within the film carrier the film is drawn from the spool and trained about the carrier, and the free end of the film engaged with the spool, which is adapted to be operated by hand for the winding of the film thereon when making successive exposures, as usual. The winding up of the film upon this latter spool causes the spring to become tensioned so that after the film has been fully and completely exposed it will be automatically wound upon the spool of the winding device E.



It is to be understood, of course, that the shaft 12 for the barrel 10 when engaged in the seat 13 is held fixed against rotation, but the barrel 10 is free to rotate thereon under the resistance of the spring therein.

Mounted within the carrier for the film is a latch lever 17 which is formed with a latch end 18 adapted to engage the head 11 adjacent thereto of the spool E so as to lock the spool against free rotation, the opposite end of the lever 17 being adapted to be engaged by means of a push button 19 which is suitably mounted within the top of the body and is accessible exteriorly thereof for manual manipulation so that on depressing the button it will rock the lever 17 to free the latch end 18 from the spool E so that the winding device will automatically operate for the rewinding of the film thereon after exposures have been made.—Joseph Millard Jordan, Junior, 2974, North Pennsylvania Avenue, Atlantic City, New Jersey, United States.

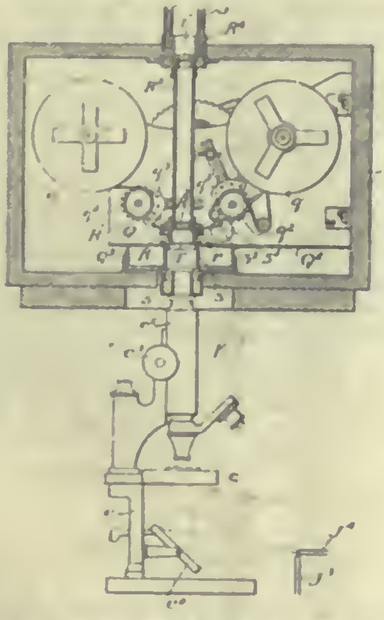
Photo-micro-cinematography.—No. 119,876 (December 30, 1916).—The invention consists in the combination of a cinematograph-camera and a microscope for obtaining cinematograph records of minute moving objects. In the drawing Q is the casing accommodating the customary mechanism of a cinematograph camera.

Within the casing is a horizontal diaphragm or partition Q^2, the latter being connected with the bottom of the casing by a light-tight coupling Q^3.

Secured to the top of the partition is a sleeve, R, the upper part of which sleeve is provided with an external lining, r, engaging with a collar, R^1, to produce a light-tight connection therewith. The collar contains a ground glass, R^2, which is positioned across the lower part of a vertical sight-tube, R^3, the latter extending upwardly within casing Q^1, and containing a suitable lens, r^1.

Around the upper part of the vertically-positioned sight-tube is fitted a double tube, R^4, the latter extending upwardly through the top of casing, Q^1. Fitted between the members of this double tube is a lined eyepiece, S, the latter being provided with means for holding the eyepiece steadily in position over the eye of an operator.

The microscope is represented as consisting of a table, c, a base or stand, c^1, for supporting the table, a lens tube, c^2, a screw adjustment, c^3, for focussing the lens tube, and a mirror, c^4, the latter being positioned below the table and being adjustable to different positions for reflecting the rays of light emanating from the arc-lamp through the lens, table and the subject on the table.



The microscope is positioned in operative relation to the moving picture mechanism, and, as shown, is removable at will from the casing. Means are provided for excluding light from entering casing, Q^1, except that beam of light which is projected by the microscope—e.g., a light-tight coupling between the lens tube of the microscope and the casing, Q^1. This coupling consists of a double-flanged member, s, and a tube s^1, fitted between the flanges of the member, s. The tube, s^1, is fastened to partition, Q^2, so as to depend downwardly therefrom, whereas the double-flanged member, s, is positioned over the upper part of lens tube, c^2, of the microscope. When properly positioned the microscope is in alignment with sight tube, R^3, and by using the two-part coupling, s s^1, the external rays of light are precluded from entering casing, Q^1, through the opening which is provided in the bottom of the casing for the reception of the microscope.

It will be understood that the operator may view the subject through the sight tube, R^3, for the reason that the images are projected by the microscope against focussing glass, R^2, a portion of the subject being visible at the edges of the film. The sight tube enables the operator to adjust the microscope for securing the proper focus. Robert Lincoln Watkins, 138, West 71st Street, New York.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, December 23.

South London Photographic Society. Excursion Slides: Evershed and Lecturette Competitions.

Friday, December 27.

Dennistoun Amateur Photographic Association. "Direct Printing Processes. R. Wallace.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, December 17, Mr. Chas. H. Oakden in the chair.

Mr. John Booth delivered a really admirable lantern lecture on Stratford-on-Avon, or rather its associations with Shakespeare. He showed his audience the many buildings and places connected with the life of the dramatist, and had much of interest to say on the life of Shakespeare.

A very hearty vote of thanks was accorded to the lecturer at the close of the meeting.

News and Notes.

Canvasser Charged.—William Bennett, of Skipton, described as a canvasser employed by James E. Peach, photographer, Lancaster was fined £1 at the Skipton Police Court last week for obtaining 6s. by false pretences from Elizabeth Martin, Brook Street, Skipton. The magistrates took a lenient view of the case on account of the accused's previous good record and the fact that his employer was willing to take him back.

The Scientist's Diary.—This handy pocket diary, issued by Messrs. James Woolley and Sons, Victoria Bridge, Manchester, at the price of 3s. 6d., is again a pocket compendium of very varied scientific data such as those of astronomy, weights and measures, atomic weights and chemical formulæ, dynamics, heat, physiology, and hygiene. The diary is issued in a stout leather covering, and will no doubt be appreciated by those whose business or occupation is in any way connected with the scientific or technical industries.

Photography at Sea.—Among the orders which have recently been cancelled is that which prohibited the unauthorised use of cameras on board a British vessel at any time or on board a foreign-owned ship within British territorial waters. The Order required the master of a British ship to take charge of all cameras in his vessel until the owners disembarked; in the case of a foreign ship the cameras were allowed to be returned when the vessel left territorial waters.

Rotherham Photographic Exhibition.—On the concluding four days of last week (December 11-14) the Rotherham Photographic Society held its 29th annual exhibition. War-time conditions compelled the cutting-out of the open section, and the engagement of a smaller hall; but the interest of the townspeople has been retained. The arrangements this year were very much on the lines of the previous four years, an innovation being the display of the Official War Photographs which had been on view at the Royal Photographic Society. Mr. Bertram Cox, Lincoln, judged the competition classes, and expressed himself well pleased with the good level of work. He also furnished some very helpful notes. The President's cup was awarded to S. G. Liversidge, and medal winners were J. M Fitzclarke, W. Firth, R. Chislett, S. G. Liversidge, and H. C. Hemmingway. The exhibition was inaugurated by Mr. A. E. Wells, president of the Chamber of Commerce. The evenings were taken up with music and lantern slide lectures. As on former occasions during the war period any profits will be devoted to charity.

Enlargement Canvassers Charged.—Two Russian Poles, Maurice Mendelson, traveller, 107, St. Mary's Road, Sheffield, and David Wolfe Borkovich, canvasser, 37, Ranach Street, Glasgow, appeared in the Sheffield Police Court recently, before Messrs. S. G. Richardson and C. J. Whitehead, on a charge of having obtained by a false pretence a sum of 21s. from Emily Gillott, of 37, Luke Lane, Wadsley. It was alleged that they claimed to be canvassing for Van Ralty's, the photographers, and obtained an order. Mrs. Lilian Woolfe, wife of Mr. Harry Woolfe, now in the army and owner of Van Ralty's, said the firm never had canvassers, and the defendants were not authorised to canvass by them. The Bench dismissed both cases.

Mendelson was then charged with failing to furnish to the Registration Officer of Sheffield particulars as to the date when he changed his place of residence.

Mr. Neal said the charge was a trivial one. The man went to Manchester on Sunday morning and missed his train on Sunday night. He was back in Sheffield the first thing on Monday morning.

The Chairman said the Bench deemed it inexpedient to punish the defendant, and he would be discharged.

Death of Mr. William Green.—The death is announced of Mr. William Green, of Berwick, best known as a photographer by the series of cloud negatives issued by him for many years past. He was a descendant of Royalty, his grandfather having been Queen Victoria's half-brother. The other marriage of the Duke of Kent is almost forgotten. Before his union with Prince Leiningen's widow, a Princess of Saxe-Saalfeld-Coburg, he contracted a morganatic marriage with a handsome French Canadian, Mlle. Julie de St. Laurent.

Their son, General W. Green, a British Army officer, had a son, a barrister, Mr. W. G. Green, who was father of the gentleman just dead.

The Duke of Kent married Mlle. de St. Laurent in 1792 in Canada, and from all accounts the couple were very happy. During their twenty-five years of married life they resided at several places—at Montmorenci Falls, Canada; at Castle Hill Lodge, Ealing; and also, we believe, Kensington Palace.

Some years after the separation the Duke's morganatic wife married again, her second husband being a distant relative, with extensive estates, still held by his family. She survived him some years, and was buried in one of our cathedrals.

Correspondence.

⁂ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

⁂ *We do not undertake responsibility for the opinions expressed by our correspondents.*

ENGINEERING PHOTOGRAPHY.

To the Editors.

Gentlemen,—The above article by "Thermit" is extremely interesting. I entirely agree with him on the usefulness of the profession to the engineering trades, but it is not used so extensively in England as in other countries, and I am of the opinion that after the war we shall see a considerable opening up in this direction.

How often most expensive machine work is put on a casting, forging, or piece of metal, without any endeavour to find out if the piece is cracked or otherwise damaged, and, after several days of expensive labour, a small crack is discovered in the final grinding, and the whole "scrapped"; this could have been discovered by photography. The average photographic assistant knows nothing whatever about micro-photography, photostat, or radio-metallography, or even the methods of faking materials or engineering parts to obtain the best result; indeed, sometimes it is very difficult to obtain a result at all; as, for instance, in the case of a minute crack in a highly polished crank-shaft situated in a difficult place, such as between the journal and web.

In the Royal Air Force there must be hundreds of highly skilled assistants who have obtained a knowledge of this work during the war, and will require positions after their release. I extremely regret that we do not see more advertisements for assistants under this heading in the "B.J.," and feel convinced that there must be some body or society who have at heart the interests of assistants, and who will take this matter up, if only with a view to preventing the assistants being sent to some "sticky-back merchant" under the present scheme of demobilisation.

I beg to make this appeal on behalf of the above-mentioned men, who have served their country well in her need, and should be only too glad to assist in any way possible to put them in touch with the positions required.—Your obedient Servant,

Edgar A. Tickle,
Sergeant i/c Photography, Engine Repair Shops, R.A.F.,
B.E.F., France.

Dec. 11, 1918.

FOR DEALING WITH THE CANVASSING PEST.

To the Editors.

Gentlemen,—I was pleased to note Mr. Foster Brigham's explanation of the misprint in the letter published in your issue of November 22, as I confess I scarcely understood the term as printed. I certainly am an advocate of the "get together" principle, and am convinced that photographers as a body have much to gain by so doing. If photographers generally would write and in friendly discussions tackle various problems which they individually are frequently up against, the results would, I feel sure, be most beneficial to all. As an illustration, take the question of the periodical visitations to most districts of the cheap and nasty enlargement touts.

Many photographers, feeling unable to deal with the matter, have seen much lucrative business slip away without even taking some steps to cope with the mischief in any shape or form. Some have, in the past, written about it in the Journal, whilst others undeterred, instead of accepting it as a necessary evil, have, by various methods, actually gained business as a result of their efforts in counteracting it.

Assuming photographers were meeting periodically as friendly bodies, surely those who had in a measure been successful in counteracting the efforts of the enlargement tout would be pleased to give for the benefit of all their experience and methods in dealing with the matter. Under such circumstances I cannot conceive that anyone would be so narrow-minded as to withhold that which would not harm him to give, but would, maybe, benefit others. Speaking personally, I should be glad to give my own experiences in the matter, which, to say the least, have not been unsuccessful.

I readily admit the same treatment would not serve in all cases, but out of the many and varied suggestions which would be forthcoming something of use would suggest itself to all.

Like Mr. Brigham, I hope for a congress next spring, and would welcome the opportunity of meeting him there; such gatherings are all to the good, but during the intervening months such bodies as the Society of Master Photographers (Lancashire), by their more frequent meetings and closer attention to and knowledge of localised needs, would, I think, give more effective results.

Faithfully yours,
Maurice W. Medcalf.

The Studio, Mexboro', December 9.

THE COMMERCIAL USE OF THE X-RAYS.

To the Editors.

Gentlemen,—Your excellent article on the "Photography of Metals with the X-Rays," by Mr. T. Thorne Baker, which appears in your issue of November 29, should interest numbers of commercial firms who, in these times of "reconstruction," are on the look-out for improved methods and the application of science to their industries.

From Mr. Thorne Baker's article, however, applying as it does exclusively to the photography of metals, one might be led to assume that this is the only non-medical use to which X-rays are at present applied; but, as he points out, this science is likely to assume widespread importance in the near future.

There are, even now, many further non-medical uses for radiography, which, if brought to the notice of commercial firms, would induce them to adopt the use of the X-rays.

For instance, at the recent British Scientific Products Exhibition, there were on view both positive and negative radiographs, not only of metal, but of wood, marble, geological specimens, flowers, and even a radioprint of an X-ray tube itself. It will be seen by this that the application of the X-rays to commerce is almost limitless.

Another point is that the use of X-ray plates for this work limits, to a certain extent, the size of the objects which can be radiographed.

The very high voltage required for radiographing metals prohibits the finding of the defects by a screen examination. Apart from the risk to the radiographer, it is impracticable. In anticipation of the demand for a material other than plates for X-ray work, a paper known as radioprint paper has been placed on the market, and this can be supplied in any size. Does not this get over the difficulty? It undoubtedly is just what is wanted for radiographing large areas.

At the exhibition above referred to, Dr. Robert Knox, in the course of a lecture, exhibited a radioprint on this paper, made at King's College Hospital, of a complete human skeleton. The size of this radioprint was about 8 ft. long by 3 ft. 6 in. wide, *in one piece*. On this material also were shown radioprints of metal, flowers, and other common objects.

Radioprint paper is in general use amongst quite a number of radiologists and hospitals, and for those interested it is just as well to mention that particulars can be obtained from the manufacturers, Messrs. Illingworth, of Willesden Junction.—Yours faithfully,

Sydney H. Bowes.

Tooting Military Hospital, London, S.W., Dec. 14.

PHOTOGRAPHERS AND ASSISTANTS.

To the Editors.

Gentlemen,—Unfortunately, one cannot comment on your excellent article and the various letters *re* the P.P.A. and Competent Assistants without being more or less personal. As that is not my motive, I trust your readers will take my criticisms and suggestions in the spirit in which they are written. My Profession first, please!

The Council of the P.P.A. is composed of gentlemen from various towns who either do or do not represent the Profession generally; if they do not then they are a humbug; if they do then why on earth haven't they produced a scheme dealing with assistants. Fifteen years ago this was mooted in the "B.J." The P.P.A. took it up and failed. Why? I think I could answer that in five minutes privately, but it would never do for the correspondence columns of your worthy journal. Two illustrations will suffice:

(1) For umpteen years I have been expecting to receive the following Pastoral letter:—Dear Brother,—I was having a chat with Mackie, and he tells me you are not a member of our show. I thought I hadn't seen you there. Why don't you join? It's awfully jolly. Everything's in the spink, you know. I got a tip on how to make glass out of cork which will defy the plate people for all time. You Fry it till it's Brown and Chase it till it is Grey, the others all revelling in seeing poor Adams apple rise when the Long'un trots out his Hairyplane proposals. But there, I'm giving you private information. Come early, I'll chaplain you through allright, old man.—Your affectionate Brother (The Parson).

(2) Many years ago I used to pass two photographers, both P.P.A. men; one did vignettes as hard as if they had been masked, the other did full lengths showing a window background lit from the right, the light on the sitter being from the left. Both are still doing them, and in spite of the "B.J." and the P.P.A., will continue to, apparently.

Now it seems to me that we shall all have to set our house in order, and at once; at the same time we mustn't forget the great changes that have taken place during the last twenty years.

As an apprentice, I used to sensitise albuminised paper 15 sheets a day, dry, cut, print all sizes, and tone. Platinum paper sometimes twelve dozen and more 12 x 10's and smaller. With the arrival of postcards this went west. Again the film cameras brought along the thousands of amateurs, whose trade was ultimately captured by the chemists instead of the photographers. The postcards again created a new type of photographer, who, being a bricklayer, commenced in the backyard and ultimately became the bane of the ordinary photographer. What he couldn't do he could always send to a trade house and still undersell. These latter are now quite the thing, and where we used to do everything on the premises, now we reduce the establishment and specialise in one or two lines leaving certain other work for the trade house. Then the arrival of the motor car has made a visit to the select photographer in town a glorious possibility which was lightly undertaken without any qualms about the local man, who might even be a tenant of the very individual (incidentally the ban on motor-cars during the war has proved this). The change from daylight-printing to bromide has been of more importance than is yet realised; and so one could go on.

What I want to point out is that we have *all* had to sacrifice much that was artistic to keep up with the times. Photography nowadays is a "compromise" between art and business.

That being so, the necessity for collective action becomes a necessity. I have thought so for years. The present Council of the P.P., omitting the country members, might represent London in a county scheme, and the country members form the nucleus of a county scheme in the several counties they come from. Each county could then select one or more representatives to be affiliated to a parent body, of which such representatives would form part. The parent body could decide to meet four times, twice, or once a year; the counties could meet monthly or quarterly. A permanent or movable Headquarters could be established, but in the event of it being London permanently, then some pooling arrangement could be agreed upon to help financially the delegates from distant counties. Yorkshire could be divided into, say, four areas, Lancashire into two, and so on; but whatever the arrangement the control must come more from the local, as distinct from headquarters. To make a start I'll volunteer to write *all* photographers in Berkshire by the New Year. Will the country members of the P.P.A. agree to do the same in their counties?

About assistants, I cannot support any scheme which does not give the fullest possible knowledge to *all*. It must be along lines which have the general approval of professional photographers and assistants as well. There must be a minimum period of apprenticeship in training. The teaching apparatus and all the details must be of standard pattern, and not the whim of whatever teacher happens to have charge. If the training be at a school then any pupils who prove that they are incapable of making headway must be gently, but firmly removed, and not kept on just to keep the fees up. If, on the other hand, the local education committees are used, then the gentleman who looks with horror on a life class will have to be dealt with. A certain standard of efficiency will have to be agreed upon, and I take it the assistants will also get some idea of the sort of situation they are going to. A minimum wage, regular hours, a recognised trial period in each new situation, with the abolition of specimens and a certificate instead will be the new order of the day. With a county scheme in full working order, a travelling examination board would simplify matters considerably. Many other details suggest themselves, but they can wait. The great thing is a start.

It will mean a good deal of sacrifice, both of time and money, but if we all "come down to earth" and take things in the spirit of Mr. Marcus Adams and Mr. Foster Brigham half the battle is won.

I take off my hat to the "B.J."—Yours faithfully,

79, St. Leonard's Road, Windsor. R. Russell.

Royal Institution.—A Christmas course of juvenile lectures will be delivered by Professor D'Arcy Thompson on "The Fish of the Sea," beginning on December 31, at 3 o'clock. Courses of lectures will be given before Easter by Professor Spenser Wilkinson on "Lessons of the War"; Professor MacGregor-Morris on "Study of Electric Arcs and their Applications"; Captain G. P. Thomson on "The Development of Aeroplanes in the Great War," and "The Dynamics of Flying"; Professor Hele-Shaw on "Clutches"; Professor C. H. Lees on "Fire Cracks and the Forces Producing Them"; Professor A. Findlay on "Colloidal Matter and its Properties"; and Professor Sir J. J. Thomson (Master of Trinity) on "Spectrum Analysis and its Application to Atomic Structure." The Friday discourses will begin on January 17, when Professor Sir James Dewar will give a lecture on "Liquid Air and the War"

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

K. B.—The only process I know of for toughening and further rendering mica fireproof is that of coating the mica with a pottery glaze, or flux, and afterwards heating to a temperature in the neighbourhood of 2,000° F. This is the patented process of Palmer and Robinson, described in specification No. 23,067 of 1914.

G. O.—Copyright in a photograph is created at the time it is made; there are no formalities to be gone through. If you make the photographs on your own and not to the order of, or for payment by, any other person, then the copyright belongs to you. But if ordered and paid for by someone else ownership of the copyright belongs to such person.

E. T.—The asphalt varnish you refer to is very suitable for developing and fixing dishes, as it is not affected by the alkali used in the developer. On the other hand, any ordinary paint, enamel, or varnish, even shellac, is quickly attacked and softened by alkalies. We would advise you to run the asphaltum solution into the joints instead of using putty, which is not at all durable. Prout's elastic glue, to be obtained from any leather-seller, would make a good cement for the joints, and is quite proof against chemicals.

V. A.—It is very difficult to advise you, but we should say two ounces of powder would not be too much and should be placed as reasonably high as you can get it, and spread out in a long shallow tray, or, better, two such trays placed one rather near to and just behind the camera, and the other further off on the other side. Unless the stage lights are very intense, that is to say, intense enough to give an image on the plate between the time of uncapping the lens and fixing the flash, it is much better to have them. In all probability they are not intense enough for this.

B. J.—(1) As regards permanency of the picture, such as it is which you get on seconds, certainly it is equal to that on the best cards, in our opinion. Probably you would help matters as regards the bluish stain of which you complain by making it an invariable rule to pass cards through two fixing baths in succession. For stress marks we know of no helpful preventive beyond avoiding all friction, keeping the developer clear, etc. (2) We understand the recent announcement to mean that photographic work is now restored to its pre-war condition as regards facility to photograph anywhere.

J. D.—Your method of fitting and screening the half-watt lamps is quite correct, but we think that you will improve the lighting by taking away the 1,000 c.p. lamp which is right in front of the sitter and bringing it round to the side in front of one of the windows. As it is, the lighting is too flat. You can reduce the exposure considerably by bringing the sitter a little nearer the lamps. If you make the distance five feet instead of six you will be able to reduce the time by about one-third. It is a good plan to have the lamps made to raise and lower, so that you can lower them a foot or so for heads and sitting figures or children.

M.T.—The following are suitable mixtures for fireproofing muslin, etc.:—(1) Ammonium sulphate, 8 lbs.; ammonium carbonate, 2.5 lbs.; boric acid, 3 lbs.; borax, 1.7 lbs.; starch, 2 lbs.; water, 100 lbs. Steep the fabric in the above solution, made hot, until thoroughly impregnated, then drain and dry sufficiently to enable it to be ironed or pressed like ordinary starched goods. (2) Borax, 12; Epsom salts, 9; dissolved in warm water, 80. The necessary quantity of starch can be used along with the solution. The fabric is treated as above. (3) Boric acid, 5; sal ammoniac, 15; potash feldspar, 5; gelatine, 1½; starch paste, 50; water, 100. This mixture is applied with a brush.

W. L.—(1) We do not think that any coating over the putty will prevent leakage. If you will remove the putty and replace with a mixture of putty and Stockholm tar, this should prove effective. (2) The General Electric Company, 67, Queen Victoria Street, E.C., will send you a booklet giving full particulars and prices of half-watt lamps and fittings; there has been a shortage in some voltages, but we believe that is now over. (3) They are not specially suitable for the purpose since much light has to be wasted in diffusing. The gridiron pattern of mercury vapour lamp is much better. (4) You will do well to buy one of the many ready-made distempers which you can get from any good oil and colour shop; size and whiting, as well as colours, are dear now, and you will not save much by attempting to make your own distemper.

C. A.—You omit a very important point in your enquiry as to enlarging apparatus—the degree of enlargement. It is upon this that the strength of light necessary mainly depends, but we do not think that you would be able to get any serviceable light from storage batteries even if of considerable size. You would do better with incandescent gas. For small negatives such as you mention a single full-size mantle, upright or inverted, placed behind two thicknesses of ground glass, say four inches apart, should give you sufficiently even illumination, or you could use two mantles in a box, one on either edge of the negative with a very pure white card reflector. This will give perfectly even illumination, but the exposure will be rather longer. The price asked for the Una outfit is a full one, but not excessive. It is about 25 per cent. under pre-war list price, and this is not at all bad now when apparatus is so scarce. The model is a well-established one and not likely to get out of date. If you want such a camera it will be a good investment.

The British Journal of Photography.

IMPORTANT NOTICE.—Advertisers are requested to notice that the prices printed below represent an

Increased Scale of Charges,

which is now in operation in respect to all line announcements.

Since advertisements cannot be inserted until fully and correctly prepaid, senders of line announcements are asked to bear in mind this revised tariff. They will thus save themselves delay in the publication of their announcements.

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Extra words ... ... 1d. per word.

(No reduction for a series.)

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"Box No." and office address ... ... charged as 6 words.

For forwarding replies add ... 6d. per insertion for each adv't.

If replies are called for this latter charge is not made.

Advertisements cannot be inserted until fully and correctly prepaid.

Orders to repeat an adv't must be accompanied by the advertisement as previously printed.

Advertisements are not accepted over the telephone.

The latest time for receiving small line advertisements is 12 o'clock (noon) on Wednesdays for the current week's issue.

Displayed Adv'ts should reach the Publishers Monday morning.

The insertion of an Advertisement in any definite issue cannot be guaranteed.

HENRY GREENWOOD & CO., Ltd., Publishers,
24, Wellington Street, Strand, LONDON, W.C. 2.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 3060. Vol. LXV. FRIDAY, DECEMBER 27, 1918. Price Twopence.

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The Summary of contents which usually occupies the lower half of his column will be found at the foot of the page overleaf and will ntinue to be placed there whilst its regular position is required for otices relating to the forthcoming "B.J. Almanac."

The Whole Field.

One respect in which the Almanac differs from all other ooks on photography is in the view it affords year by ear of what is being done in the many branches of photoraphy. An ordinary manual, particularly one on a pecial branch, cannot be published in such rapidly succeeding editions that its contents are kept up to date. For this reason most of the photographic text-books are lways behind the times in the information they give. Their out-of-dateness may be a matter of a year or so, or s much as ten years. In the Almanac, on the other and, a special feature is made of collecting and arrangng the items of practice, progress, and invention which ave come up during the preceding twelve months. It thus a manual which has rid itself of the dead weight facts that are well known: a manual which contains the test hints, notes and formulæ relating to the various anches of photographic work.

The publication of such an "Epitome of Progress" in ch issue of the Almanac renders a set of the volumes the ost valuable storehouse of information. Readers who ve the volumes for the past ten or twelve years know is to be the case: those to whom the Almanac is a new blication may advisedly bear in mind this feature of it. ey will thus be joining the ranks of the many who ssess a row of Almanacs upon their shelves. It may said without exaggeration that no other series of lumes provides so much readily accessible information so compact a form.

EX CATHEDRA.

Warm-Toned Lantern Slides. Methods of producing lantern slides of warm colour by processes of toning the black-developed slide were left severely alone by Mr. Dudley Johnston in his recent admirable address before the Royal Photographic Society, and very properly so if the lecturer had in mind the methods which are most commonly employed, viz., with copper and uranium salts. These are unsuited to the delicate and finely graduated effects which distinguish Mr. Johnston's work. But among the lesser employed processes there are those which, we think, are deserving of more attention by lantern-slide makers. We refer more especially to those in which a black silver image developed in the ordinary way is halogenised, *i.e.*, converted into silver bromide, chloride, or iodide. The results are characterised by very delicate colours and equally by excellent transparency in the shadows, the latter a quality in which the copper and uranium processes are notably deficient. Moreover, the results are at any rate as permanent as the untoned transparency, while exposures need not be prolonged for their production. The range of tones is not, however, very great, but that drawback is removed by the process in which a silver iodide image is dyed. A modification of method, as recently worked in a very thorough way by Mr. Crabtree of the Eastman Research Laboratory, is one which it is to be hoped may be popularised in the near future by the supply of the necessary dye solutions.

* * *

Shutters and Lens Aperture. At the present time, when camera design is engaging the attention of manufacturers with a view to securing after-the-war trade among amateur and professional photographers, there is one point which, if carried into practice, will make the apparatus of the future superior on the score of efficiency to much of that supplied in the past. We refer to the between-lens shutters of the "sector" pattern supplied with many hand cameras fitted with large-aperture anastigmat lenses. In the few years preceding the war there was a tendency on the part of manufacturers to cut down both bulk and weight, without realising what had to be sacrificed for the sake of saving a few ounces, or for appearance. This was especially the case with the type of shutter above mentioned. Some time ago we were using one of these upon a hand camera, fitted with a large-aperture anastigmat. The negatives on that occasion turning out much under-exposed, the cause of the trouble was found in the shutter. This latter instrument was built upon so small a scale that the blades when fully open did not uncover the full aperture of the lens, thus making it very considerably slower. The instrument was subsequently found to be a standard model, and supplied by the makers of the camera. It is, of course, impossible to produce a perfect shutter at a low price, but there is no reason why such an instrument as supplied on the very cheapest cameras should not be large enough to give the benefit of the fullest aperture of the lens. In the case of roller-blind shutters, the demands of lightness and portability have not made such an inroad upon efficiency, and they are far more satisfactory in the way mentioned. Cheap shutters of the sector pattern were imported in thousands before the war. Some of them were great offenders in this respect of "cut-off," and it is to be hoped that British makers will see that their lenses do not suffer in reputation through the fault of the shutter.

* * *

Second-hand Lenses. Much time and thought are doubtless being given at the present time by photographers who wish to add to their lens equipment, to the advisability, or otherwise, of attempting to find what they need through the second-hand market. There is no doubt that a first-class lens, both as regards quality and condition, may even now be bought for far less than it cost new. A word of warning as regards price, however, is needed, for at the present time the prospective buyer will do well not to look for an instrument much under its usual price when new. Recently we were quoted two different prices by two different dealers for the same type of lens. The instruments were identical as regards make, construction, series, and focal length, as well as aperture, yet one was priced at nearly 20 per cent. more than the other. We went to the trouble to examine these two lenses, and found that the more expensive one of the two was decidedly the better value for the money. The cheaper had been badly used; its glasses were scratched, and its defining power was considerably less. While on the subject, we may point out that when the seller has a reputation to maintain the price asked is a valuable guide as to the condition of the apparatus: anything less than 25 per cent. off the original list price is to be regarded with suspicion. In this way the reputation of the dealer becomes of real value to the purchaser. There is also the guarantee that the instrument offered is genuine and not a forgery, an assurance which the inexperienced buyer will be glad to have as a protection against having inferior apparatus palmed off upon him at far in excess of its value. An instance of this came to our notice a short time ago. A photographer bought and paid for a lens supposed to be by a standard maker, whose name was on the lens mount. The vendor was a stranger, the medium a daily newspaper, and the price tempting, and for this reason the deal was rather hastily concluded. In actual work the photographer was dissatisfied with the results produced with the lens, and decided to dispose of it. The instrument was sent to a large dealer for the usual valuation, and in reply came a letter to state that, though the lens mount was that employed and issued by Messrs. ——, the components of the instrument were those of an ordinary RR., with an extra glass inserted to carry out the fraud. If that photographer had gone to a reliable dealer, who would in the course of a long experience have detected such a fraud at once, he would have been saved a good sum.

* * *

Stained Negatives. Few workers realise what an important part the actual colour of the negative has in the amount of exposure required when bromide printing or enlarging. An instance of this came under our notice recently. A photographer, who always employs one of the modern single-solution, highly concentrated, non-staining developers, had to make a set of prints from a number of negatives made some years ago by a former operator and developed with pyro soda. Of course, these negatives were slightly stained. This the worker observed, but as the result of long practice he mentally gauged the density of the negatives by his own, allowing a little extra, as he thought, when exposing for the stained films. A large batch of paper was exposed, and when he came to develop he found to his surprise that the whole was grossly under-exposed, so much so in fact that some of the prints showed but a ghost of an image. That experience has taught that operator one thing—that it is impossible to guess the amount that a pyro stain may add to the density of a negative. In the present case it was subsequently found that, though the negatives were alike in density to those produced with the modern non-staining developer, actually when printing upon a certain development paper twice as much exposure was required, and even then the prints differed in character, being much the harsher. In such cases the only way to be certain is to make a careful trial. Many photographers still cling firmly to the older pyro-soda formulæ, and when reminded of the stained image that it gives assert that that stain gives a printing quality to the negative wholly absent from the productions of the modern developer. Certainly, when bromide-printing, we have found that pyro-stained negatives take far longer than the others from which this "quality" is absent, so that for time-saving the modern developer scores.

SUMMARY.

A note on warm tones in lantern-slides, pointing out the possibility of obtaining any desired tint with uniformity and certainty by using the dyed silver iodide process, will be found on page 577.

An effort to further popularise the use of panchromatic plates by removing a few prevalent misconceptions regarding difficulties in manipulation forms the subject of an article on page 579.

Some suggestions as to how ordinary photographers may improve their work by studying the methods of the cinematograph studio are made on page 579.

Our American friend, Mr John A. Tennant, asserts that photographers on the other side fail to do justice to the beauty of American women, and he gives some hints on the posing and arranging of the figure, in the hope of removing this reproach. (P. 581.)

The half-watt lamp promises to oust the arc light in many branches of photographic work. A system of employing it in cinematograph projection. with full details as to the necessary fittings, is outlined on page 582.

A weakness in some shutters of the between-lens pattern, which prevents the full aperture of the lens from being utilised, is alluded to on page 577.

Although a second-hand lens may be truly described in an advertisement or dealers' list, the condition of the glasses is not always specified; hence, a similar lens at a higher price may be better value than an apparently cheaper one. This point and also misrepresentation in lens selling are dealt with in a paragraph on page 578.

A condition against under-estimating the light-stopping power of even a slight pyro-stain in the negative, when enlarging or printing, is given on page 578.

The great advances made in the manufacture of optical glass in this country during the war are described by a writer in our correspondence columns. (P. 587.)

Artificial lighting of the studio, enlarging apparatus, and payment of assistants during sickness are among the matters dealt with in "Answers to Correspondents." (P. 588.)

Under patent news we reprint the specification of an entirely novel form of panoramic camera, primarily intended for delineating the entire dome of the sky or making a map from the entire horizon to a point beneath the lens when the camera is suspended from a balloon or aeroplane. Another specification describes an exposure calculator on the graphic diagram system. (P. 584.)

WHAT PANCHROMATIC PLATES WILL DO.

It has taken many years to educate the steady-going studio photographer to the use of colour-sensitive or "ortho" plates even for copies and special subjects, and n many studios they are still unknown. Hence it is not surprising that the panchromatic plate, with all its advantages, has penetrated into few establishments, these being mainly process and commercial houses. It is true that panchromatics cost more than do ordinary plates, but even when they cost less than half what the latter do now, photographers looked askance at them—why, we cannot ell, nor do we suppose can they.

There are a few misconceptions regarding these very aluable plates which we will try to remove. In the irst place, there is an idea that panchromatic plates are uitable only for special subjects, and that they are not available for use without a yellow filter. This is quite wrong. There is nothing that can be done with an ordinary plate that cannot be better done with a panchromatic, and although a filter is necessary if perfect colour rendering is required they are better than the ordinary ones even if used without it for any subject into which colour enters. Especially is this true of the newer nakes which are prepared with Professor Pope's British-nade dyes, which we suppose will now be used exclusively. Recently we had occasion to notice that one of hese plates gave as good a colour rendering without a ilter as one of the older orthochromatic plates gave with ne. Nevertheless, we strongly advocate the use of a ilter even if it be only an æsculine one, which cuts out he ultra-violet rays but does not appreciably increase the xposure. Respecting this screen, which is not supposed o be durable, we may say that a week ago we tested gelatine film screen of this kind which had retained its properties for nearly seven years. Therefore, there is o need to be troubled with a liquid screen, which many people object to.

The second misconception is that some disadvantage is ttached to the fact that panchromatic plates require handling in perfect darkness. There is really nothing in his. With ordinary care even unbacked plates can be lled into the slides and placed in the developer without langer of using the wrong side, while if they are backed t is next to impossible to make a mistake. The old idea hat it is necessary to watch the development of a plate hould be quite exploded now, and it is quite unnecessary o keep the dark-room without even a red light if the plates are developed in a covered tank, or if the dish is placed in a light-tight box which can be rocked for the ew minutes necessary for development. We have eveloped some thousands of plates in this way, and can ssure our readers that the quality of the negatives was even as if they had been developed in a good nonctinic light of the usual kind.

Another mistake is to think that panchromatic plates rapidly deteriorate by keeping; this we have not found to be the case. We have used them of various ages up to four years, at the end of which time they have slightly darkened round the edges, but not more than some process plates which had been stored with them, while the colour-sensitiveness had decreased but little.

As to their everyday application, we would point out that certain subjects, such as old dark oil paintings, most dark woods, and many other deeply-coloured objects, can only be successfully rendered by them, while with many other objects which do not appear to the eye to require any special treatment the difference in the results obtained against ordinary and even ortho plates must be seen to be believed.

For portraiture they are admirable, and we believe that no operator who relies upon the lens rather than upon the retouching pencil would ever use an ordinary plate after a fair trial. Used with a K 2 or even a K 1 screen the images appear as smooth as if highly retouched, of course leaving the question of lighting and facial irregularities out of the question. Deep yellow or red hair gets its true visual value and does not appear black, but full of detail, while freckles disappear and sallow complexions do not appear heavy and dirty. Freckles are, of course, obliterated, and there is a general softness of definition, due to the fact that the little red blood vessels just under the skin are not rendered as dark spots, which give a rough texture on even an orthochromatic film.

For landscape work the newer kinds render the greens perfectly, and there is none of the hard contrasts we are accustomed to see with ordinary plates. Clouds, if present, can be secured of such density that they print without dodging, and with a suitable screen, foreground and distance will be in harmonious relation to each other.

It is hardly necessary to point out to scientific workers that for all microscopical work, stained preparations, anatomical subjects, and nearly every other class of work they are indispensable, while for industrial work they are equally useful. Furniture, machinery, coloured diagrams all call for a plate giving true colour values, while for the three-colour worker, either in carbon, dyed gelatine, or etched plates, no other kind is possible. As an example of their powers, we were told that a technical photographer was recently called upon to dissect some elaborate colour diagrams in which certain movements were shown on the one sheet in coloured graphic curves upon black ruled squares. With the aid of the panchromatic plate, and suitable contrast screens each colour was isolated so that it could be shown as a separate diagram, the black lines being, of course, common to all.

We hope that our remarks may lead those who feel that there is a possibility of improving their work to give these plates a trial, and we wish to say that we are alluding to no one make. We have worked with all makes, including some of our own preparation, and though differing in details have found all far superior to other plates even if yellow-sensitive.

HINTS FOR PHOTOGRAPHERS FROM MOTION PICTURES.

he ordinary portrait or commercial photographer might very rofitably pay more attention to the various technical hints educible from motion films. Many valuable lessons may be arned in this way, and applied at leisure to his own particular work.

What first strikes one when viewing film pictures on the reen is their superb definition, after such an enormous degree of enlargement. The ratio is approximately nine times as great as an announcement or title lantern slide projected to the same size, yet in how many cases is the latter noticed to be inferior in definition to the motion film. This fact is the more remarkable when it is remembered that the positive cinematograph film is printed by contact from the negative, the two being run rapidly past an exposure aperture, usually with intermittent stoppages, while the lantern slides are, sometimes at least, made by reduction. It speaks volumes for the delicate precision and exactitude of the cinema printer mechanism, and for the patient care bestowed on every stage of the work. Would that the same standard of rigidity and accuracy obtained in ordinary photographic apparatus, and that all camera craftsmen were as free from slipshod ways!

The reasons for the generally better definition of cinema films as compared with lantern slides will repay inquiry. Undoubtedly the chief is the very short focus of the taking lens used on the motion-picture camera, generally between 2 ins. and 3 ins. Not only does the shorter focus mean far greater depth of definition, but it is often overlooked that the latter is also equivalent to a smaller circle of least confusion. The same moral is constantly being discovered by owners of vest-pocket cameras—namely, that the tiny negative made with a good-class lens of short focus will actually enlarge further and give better results than a bigger negative obtained in a larger camera with a relatively long-focus lens.

Yet another point is that the lantern slide, as often as not, is made from a negative secured with a rapid rectilinear lens, while the cinematograph taking lens is almost always an anastigmat. It has of late been confidently affirmed by some workers that one lens will, in practice, equal the performance of the other. To such a comparative test, by making transparencies and projecting to a fair size on the screen, is recommended as a clear proof to the contrary. To be strictly just, it must be remembered that the cinema projection objective is usually of a higher grade than that employed for showing lantern slides; but, given good focussing, this should not much affect the comparison.

A further fact which will bear pondering over is the excellent perspective and absence of what is conveniently, but incorrectly, called distortion in the majority of cinema films. Studio photographers are apt to grumble when condemned to use a lens of, say, from 4 ins. to 6 ins. focus in a small space; yet the cinematographer gets admirable portraits with still shorter foci. The explanation, of course, is the much smaller picture, for even with a 2-in. lens the focus is nearly twice the diagonal of the film image. Here is a self-evident and serviceable hint for the man who cannot obtain a decent size studio—to use a very short-focus lens, take only small negatives and enlarge from them instead of printing by contact. Indeed, as the writer pointed out two years ago ("B. J.," December 8, 1916), one might do worse than actually employ a motion-picture camera for the purpose.

Then, from the art side, observe the admirable grouping, the unconscious and telling ease of pose, the effective handling of background and accessories in first-rate cinematograph pictures. Has not the average portrait photographer much to learn in these directions from his confrère of the "movies"? At first sight it would be difficult to tell whether the results are obtained by day or artificial light, which is a high tribute, for both are probably used to about an equal extent. The film producer's ideas of electric lighting are on a much more sumptuous scale than would be possible in most portrait studios. Usually numbers of arc lamps or frames of mercury-vapour lamps, sometimes both, are swung high overhead, direct light being screened from the subject, and inclined white reflectors, also elevated, used for the actual lighting. A smaller number of subsidiary lamps are often arranged lower down, to soften the shadows. Sometimes the reflectors are dispensed with, and the lamps furnished with muslin diffusing screens. The main points to be noticed, as contrasted with the average portrait photographer's ideal of a concentrated and comparatively low light, are the number of the lamps and the space over which they are spread, their height, and the care taken to ensure diffusion.

For those who can get the opportunity, a visit to the studio of a large film producer is strongly advised. It is sure to give a broadened outlook, even if some of its methods are not considered altogether applicable to the different problems and conditions of portraiture.

A. LOCKETT.

PORTRAITS OF WOMEN.

[The following notes by Mr. John A. Tennant, editor of "The Photo-Miniature," are prompted by the reflection that American photographers have failed to do justice to the beauty of American women. Hence this address on methods and principles to the readers of the "American Journal of Photography." They deserve a careful study by those who think that British photographs of women may be criticised for a like disability.—EDS. "B. J."]

THE first portrait made by photography was a portrait of a woman. Ninety per cent. of the work done by the professional photographer comprises pictures of women and children. This proportion has been maintained since photography began, and will doubtless persist until the end. If women and children were photographed as rarely as men are, three-quarters of those engaged in photographic portraiture as a profession would have to seek some other means of livelihood.

Taking the facts above stated as indisputable, one would naturally suppose (1) that the photographer would devote particular study to the possibilities in women as subjects for his art; (2) that the disproportionate amount of practice expended on women would make the photographer preëminently skilful in this special field, and (3) that he would give considerable attention to women from a business standpoint.

Does he? Indirectly, yes; intelligently and persistently, no. The average photographer accepts the facts as stated, and lets them go at that. He knows that the majority of his customers will naturally be women, because of human nature. Women are naturally graceful, and, of themselves, strive after pictorial effects; hence, they are easier to handle, and make more pleasing pictures than men. The photographer naturally desires to please his customers, and for his women customers as naturally does his best as far as his abilities go. But I hold that women deserve more than this. I am just as certain that women will appreciate and pay for all the consideration the photographer will give them. As a class they are sorely neglected by photographers.

Let us take New York, for example. One cannot pass through the city's streets day by day without noting the preponderance of beautiful women. But look through the display frames of the city's studios, and you will willingly agree with the ungallant San Franciscan when he says: "Your New York woman is 'nothing extra' in the way of beauty." I have observed this for years. Our women are beautiful beyond question. Our photographs of women are utterly inadequate. You can wander up Fifth Avenue or Broadway and hardly see a photograph of a woman worthy of a passing glance.

What are the faults? Bad composition and lack of grace chiefly. Beauty is always interesting. These portraits fail to interest because they lack the attraction of beauty. The average photographer does not yet seem to have learned how to pose a woman so as to express the grace and beauty—the grace of manner and movement, the beauty of form and draperies—with which nature and art have endowed her. And there is usually even less skill seen in the arrangement of the figure and its accessories within the picture space—the composition of the picture.

With women the three-quarter or full-figure pose is generally most desirable, but considering the abundance of opportunity we do not see that profusion of figure-portraits of women which one would naturally expect. And much more rarely, indeed, do we see a pose which has not some obvious and easily avoided defect. Women have more natural grace than men and less awkwardness of carriage; their draperies, too, offer a more pleasing variety of lines than is possible with masculine dress. Moreover, it is much easier to give a woman something to do which will supply motive and interest in a portrait, beside enabling one to secure grace of action or harmony in arrangement.

The most common fault in portraits of women is the too obvious pose. This is generally expressed in a nervous or conscious strain after attitude. The first element of success, therefore, must be flexibility, the relaxation natural to the figure when it is unconsciously easy. Where this nervousness is observed a good plan is to occupy the subject with some phase of action natural to a woman, as, for instance, the arranging of flowers, and the like. In this way, by seizing an opportune moment one may secure animation and grace of line in the figure as well as naturalness of expression. The moment of arrested motion may also be used to secure an animated and characteristic pose, as when a woman turns to greet a friend entering her room, or inclines the figure to take up something from a table, to arrange a lock of hair at the side of the head, etc. In all these details wherein we have pleasure in daily life a portrait may be had which will possess an easier grace than any formal pose.

It will often happen, however, that a more or less formal pose is desirable to exhibit the figure or the costume. In such cases the pose depends upon the peculiar charm or beauty of these features. It may be that accessories will be needed to help out the lines, but these must be used skilfully because of their influence upon the proportion of the figure. For instance, in a standing pose of a woman under the average height, a low-backed chair of slight width and with long lines will add height and grace. The softly outlined, flowing folds of a curtain behind the figure, barely more than suggested, will also give the desirable appearance of height, or the subject may be made to stand (if it is accomplished without loss of ease) upon a very low footstool or a book placed upon the floor. The very common habit of permitting a space between the bottom of the front of the dress and the floor in standing poses should be avoided; it depends very largely upon the way in which the subject stands. Where the skirt itself is short, as in the present style, a sitting pose should be chosen. The standing pose is undoubtedly the best with most women for showing the figure and costume to the best advantage. Stiffness, when it is apparent, may be obviated by giving the figure a slight turn from or toward the light.

The profile of the figure, with the head turned to the three-quarter view, generally gives a graceful pose; in handling a plump figure in this manner, however, vertical lines near to the subject should be avoided as accentuating the curves of the figure in a disagreeable way. If the subject shows a costume with unusual fulness at the shoulders or bust, it is well, where possible, to make use of the hat to give proportion to the head, which might otherwise appear insignificant. Similarly, where the hat gives the head undue proportion, the sitter should be persuaded to remove it.

The principal lines of the pose should always be disposed so as to lead the eye around the figure, with the head as the chief point of interest. Abrupt angles, I need hardly say, should be guarded against, and the "line of grace" adopted for the general direction of the predominant lines through the figure. The forms of composition indicated are, of course, the pyramid, or the use of the "decorative line." When the pyramidal form is used care must be exercised to see that the centre of gravity falls within the pyramid, or the figure will be unbalanced and appear as if ready to fall over. The alternative method is advantageous when the figure is in any other than an erect position; in its use a sense of balance is the essential thing to be secured after grace.

In both standing and sitting poses the carriage of the head has great influence upon the success or failure of the portrait, altering its outlines in a remarkable way, both as regards proportion and general effect. The lines formed by the dress when the subject is seated offer considerable difficulty in their harmonious arrangement, having a tendency to fall into triangles, the apex of which is indicated by the knees. This difficulty may be obviated to some extent by selecting a chair of the right height for the particular subject—i.e., one which is neither too high nor too low, so that the knees are not elevated. The sitter should also be seated well forward, so that the legs are bent at an acute rather than a right angle; in this way the folds of the skirt will fall more freely. The practice of drawing the dress tightly about the lower part of the body, showing the form of the hips and figure, cannot be too harshly condemned. In like manner, a standing pose is often seen in which the hands are joined over the lower part of the abdomen, this latter catching the light, and so being made more prominent because it is framed by the arms. A similar fault is that of seating a woman in *décolleté* dress too low, or inclining the body too far forward, so that the shoulders and bust are displayed in a way bordering upon vulgarity.

The most troublesome feature of the figure-pose, however, is the disposition of the hands, about which women are sensitive to a degree. In consequence of this we find, in looking over a number of portraits of women, that the hands are most often conspicuous by their absence. Sometimes they are placed behind the back or hidden under the pages of a book, or fan, or among a few flowers; at other times they are hidden in folds of the skirt or by a light cape. When shown, the general complaint is that they are too large, a notion which has some foundation in truth, but also largely the result of the invariable practice among painters to represent the hands smaller than they are in life. There are various ways of meeting the difficulty, the best of which is to make one's self thoroughly familiar with the hand, its anatomy, its expressiveness, its varieties of arrangement and most graceful positions. Very much depends upon the distance of the lens.

In the treatment of the hands the first rule should be to avoid showing their full width, or, if they must be so placed, to see that they are so lighted or modelled by shadow that their apparent width is lessened. Sometimes one hand may be completely in half shadow with advantage. When a head, for instance, is posed leaning upon one hand, the effect is much better if the hand be against the dark side of the face and thrown into shadow by the head; and when the hands are not placed close together, so as to make a group in themselves, it would, I think, always be better to subdue one of them somewhat by shadow.

As we have in hands a repetition of the same form several times in the fingers, we must endeavour to vary them somewhat. When the fingers are extended straight out and held close together, the effect is stiff; and if they be kept straight and spread equally, the result is a sprawled, awkward look. When the hand is open, three fingers pose together better than two, and some of the fingers should be drawn up, but not all equally. A completely doubled-up hand is not good—it is too like a fist; but a pose in the position of holding a pen or pencil, as when writing or drawing, is one which looks well from many points of view. A very bad arrangement of the hand is when it is held flat and the fingers doubled up to the second joint; the squareness of the form and the impression of the ends of the fingers being cut off are very unpleasant. Again, the hand very much doubled up, but the index finger fully extended, is an arrangement which looks exceedingly awkward from several points of view.

A graceful pose is to bring the thumb and second finger slightly together, with the remaining fingers slightly raised. In this position turn the hand in any way you choose and you will find agreeable lines, which will need but little correction to appear pleasing. The wrists, as well as the arms, will play important rôles in the composition of the lines, but can be mastered with very little observation.

When the sitter is a person of education or refinement it will often be noticed that the hands naturally assume a graceful position. Where this is observed the natural arrangement should be accepted. It is always the most characteristic when unconcerned, and drawing the attention of the subject to the hands will almost invariably result in awkwardness.

In small groups of two or three people—intimate friends or members of a family—a pleasing arrangement is not so difficult. They may be interested in the reading of a letter or book, or engaged in conversation, or occupied with the antics of a child. Small groups of young men or young women are also easy to manage, because they may be occupied in something of common interest. When the lower parts of the figures present difficulty, the seating of the figures at a table will obviate the difficulty. In such pictures the form of the composition may be pyramidal, or we may simply seek a well-balanced arrangement and variety of line in the position of the heads or in the figures.

Beware of confusion of interest or too much complexity. The figures should not be too close together, nor the combination too large for the space it occupies, or the effect will be unpleasant. Sometimes the horizontal form suggests itself, as in a group of three children, of which the half figures only are shown. In such a case the figures can be made to overlap each other, especially with children, but great care is needed here to secure a graceful outline of the heads. Speaking generally, a convex outline is preferable in all groups as giving solidarity, boldness, and grace. This line need not depend upon the figures, but may be secured by draperies or accessories, which, however, are not to be used unless directly helpful. Angles, and especially right angles and parallel lines of heads, are to be avoided, since they disturb the eye and prevent it from uniting the various parts of the group, which is essential to its unity. The heads are always the chief points of interest, and their relative position is the most important factor in the success of the group. They should not be so placed as to form any regular or geometrical pattern, nor placed directly above each other. Very little differences of position are important here, and will give pleasing variety. The lines connecting the figures composing a group should be as simple and as graceful as possible. Thus a harsh, horizontal line between two figures will give the appearance of separation rather than of unity. Repetition of the same line or curve will sometimes be useful to convey a sense of unity obtainable in no other way. Converging lines should be avoided, unless there is some point of special interest at their convergence, as they will concentrate interest there.

There should always be a sinuous line connecting the figures, so that none may be isolated and the effect of unity be lost. Similarly, whenever it is possible to express action in a group, this opportunity to supply interest to the composition should not be passed unheeded. In group composition there is abundant room for variety in pose and effect, the common purpose giving completeness of interest. Thus two or three young women may be arranged as chatting over a friendly cup of tea.

John A. Tennant.

FOCUS FILAMENT LAMPS IN OPTICAL PROJECTION

[We have alluded in previous articles to the developments in apparatus, such as lanterns and enlargers, for optical projection which are opened up by the high-power focus type of filament electric lamps and the modifications in the optical arrangements which this description of lamp necessitates if its greatest efficiency is to be secured. These modified arrangements are very fully specified in the following notes by R. P. Burrows and J. T. Caldwell of the Engineering Department of the General Electric Co. of America, the makers there of Mazda lamps, and though they are written in reference to cinematograph projection, they emphasise the possibilities of the lamps in instruments employing projection upon a more moderate scale.—Eds. "B. J."]

The Mazda C incandescent lamp has broadened the application of incandescent lamps into the fields previously dominated by the carbon arc. The carbon arc for street and industrial lighting, and for nearly every application with the exception of projection, has been replaced by the incandescent lamp. It has been stated that the incandescent lamp would never replace the arc in projection, with special reference to motion pictures, because of its inherent limitations. The principal limitation is the relatively low intrinsic brilliancy of the source. If only the common types of incandescent lamps and the usual optical systems are considered, then such a statement is true. However, new incandescent lamp design and a sympathetic design of the optical system has made it possible to accomplish the results desired. It is reasonable to expect that a few years will see incandescent lamps as widely used in this field as in others previously dominated by the carbon arc.

Better Utilisation of Light.

The first thing that suggests itself in this application is that better light utilisation can be obtained more readily with the incandescent lamp than with the carbon arc; for example, shorter rear focus condensing lenses can be used which gather in more of the light radiated from the filament. The source of heat, the lamp filament, is confined in a bulb, and consequently the danger of overheating and cracking the condensing lenses and the depositing of carbon dust on them is eliminated. Also, much of the light of the carbon arc is lost because it cannot be directed towards the condensing lens. With an incandescent lamp mirrors can be employed to utilise a relatively large part of the light which does not strike the condenser directly. The second point which suggests itself is to so arrange the filament that the maximum amount of light radiated from the filament is subtended by the angles utilised by the mirror and condensing lens. Such regulation of the distribution of light can be more readily accomplished with the incandescent lamp than with previous illuminants.

The National Mazda lamp designed for motion-picture projection includes the feature of proper light distribution with maximum light output. It takes 20 amperes at 28-30 volts. The bulb is 2½ ins. in diameter, and, with the mogul base, is approximately 10 ins. long. The light centre length is 4¾ ins. The filament construction is peculiar to this type of lamp. The wire is coiled and mounted so that there are four parallel sections of filament of equal length, with a space between each section equal to about 0.6 of the diameter of the coil. Distribution of light from this filament form is such that it can be most readily utilised by the condensing lens. The space between the sections is filled up with an image of the filaments, by means of the spherical mirror. The mirror is 4½ ins. in diameter, with a radius of outside curvature of 2¾ ins., and an approximate focal length of 1 13-32 ins. The filament of the lamp should be set at the radius of outside curvature of the mirror. The mirror is backed with a heat-resisting material to withstand temperature of 125 deg. to 150 deg. Centigrade. The spherical mirror performs two functions:—

1. It approximates a solid band of light by filling in the space between the filament sections, and

2. It utilises the light from that portion of the filament farthest from the condensing lens, projecting the light back to the source and increasing the light on the screen from 50 to 75 per cent., depending upon the mirror used and the spacing between filament sections.

In order to utilise a maximum of the light generated by the incandescent lamp it was necessary to obtain a short rear focus condensing lens. The difficulties with such condensing lenses are:—

First—The increased absorption due to thick lenses, and

Second—Chromatic aberration or colour streaks at the edges of the picture.

These difficulties were eliminated by the use of a prismatic lens of the Fresnel type. This condenser utilises a solid angle of 76 deg., as compared to a solid angle of 45 deg. from the arc lamp condenser. The prisms are so arranged and designed as to make the condensing system as thin as possible and so to distribute the light on the film as to give a perfectly "flat picture." The lens is 3½ ins. in diameter, with 2 ins.-5 ins. foci. The lamp filament should operate 2 ins. from the centre of the condensing lens, and the centre of the lens should be 5 ins. from the aperture plate of the motion-picture machine, with the corrugations of the condenser facing the aperture plate.

The correct operating position of the lamp, mirror, and condenser with respect to each other and the aperture plate, with the various dimensions, is shown in Fig. 1.

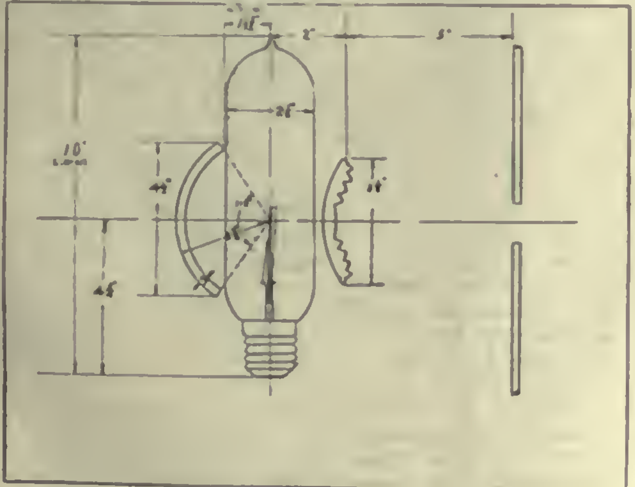

Fig. 1.

Adjustment of Lamp, Mirror and Condenser.

The complete optical system of Mazda C lamp equipment for the projection of motion pictures is shown in the sketch, Fig. 2. A number of things must be done in order to place the lamp and mirror in the correct operating position. First, it is essential that the plane of the four parallel coils of the filament be perpendicular to the optical axis—which is an imaginary line drawn through the centres of the screen, the projection lens, the aperture plate, the condenser, the lamp filament, and the mirror. Then the lamp should be moved horizontally backward and forward, vertically and up and down, and horizontally sideways until the image of the coils of the filament can be seen very distinctly on a piece of white cardboard or paper held against the wing shutter in front of the projection lens. Then the mirror should be inserted, making the proper adjustments so that the mirrored image of the coils appears on the card as brightly as possible in the spaces between the direct image of the coil, which is also on the card. Extreme care should be taken not to focus the mirrored image over the direct image.

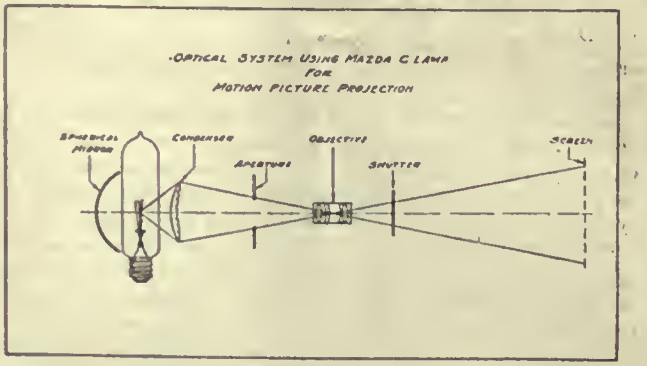

Fig. 2.

Methods of Increasing Screen Illumination.

There is some uncertainty at present in the minds of theatre managements as to how bright a motion picture should be shown. The tendency in the past has been toward brighter and brighter pictures, but to-day the trend appears to be toward pictures of moderate brightness. However, there is a possibility of increasing the screen illumination obtained with the Mazda lamp equipment, by the use of wide aperture projection lenses. The wider the aperture of the projection lens—that is, the larger the diameter of the opening of the lens, the more light there will be projected on the screen. The projection lens in use for different diameters of free opening depends upon the manufacturer. One manufacturer is marketing a 42-millimetre and a 61-millimetre projection lens, known as a No. 1 and a No. 2 lens respectively, whereas another manufacturer makes projection lenses having a diameter opening of 46 millimetres and 65 millimetres. The change from a projection lens of the 42 millimetre to 61 millimetre free opening of the same equivalent focus increases the amount of illumination on the screen by approximately 100 per cent. The use of a No. 2 lens, that is, the 61 or 65-millimetre diameter free opening, wherever it is possible to obtain the better lens in this size, will give a brighter picture, though not necessarily a better one.

The illumination obtained with the Mazda lamp will also be increased by equipping the motion-picture machine with a two-wing shutter with the shutter just wide enough to eliminate travel ghost. The width of these wings will depend upon the type of projection lens used, and with a little experimenting on the part of an operator who is familiar with the shutter the correct width can be easily determined.

Metallic and selective screens offer a picture brightness of from one to seven times that of white paint and muslin screens for projected beams of equal power. Therefore, whether in a wide or narrow theatre, when the proper metallic screen is used, it is possible to project a satisfactory picture of larger dimensions than could be secured with another screen at the same distance. Since it is not possible to project a picture in the neighbourhood of 12 ft. in width where a paint or muslin screen is used, it is therefore possible to project a picture 13½ to 14 ft. in width when a good type of metallic screen is used.

Control Apparatus.

The 20-ampere, 28-30 volt Mazda lamp, like incandescent lamps for regular lighting service, operates equally well on either direct or alternating current, with no difference in the light output.

It has been proved that with the National Mazda C projector lamp a satisfactory picture can be projected when operating this lamp on alternating current having a frequency as low as 25 cycles, hence installations are not confined to 60-cycle alternating current for satisfactory projection.

On direct current a D.C. Compensarc, consisting of a motor-generator set, or rotary converter with proper control equipment and ammeters, is used to supply the lower voltage required by the Mazda lamp. Of course, it is possible to use on direct-current circuits a resistance with a sensitive adjustment, and an ammeter, but this is not practical because of the energy lost in the resistance.

The General Electric Company has developed a compensarc for the use of the 20-ampere Mazda C lamp on 110-120 volt and 220 volt A.C. circuits, which is known as the Type I Compensarc. This compensarc includes a variable resistance in the primary circuit to take care of the variations in line voltage, thus enabling the operator to maintain the normal current on the lamp. An ammeter is placed in the secondary circuit of the compensarc, and a four-point starting switch is included in the equipment. This switch eliminates the possibility of a rush of current through the cold lamp when the current is first applied, for the connections are such that the current is gradually increased as the switch is turned from the "off" to the full current position.

The General Electric Company has also designed a panel attachment for the present arc lamp compensarc. This panel includes a rheostat for regulation, an ammeter, a reactance coil, and the four-point starting switch. It can be adapted to any arc compensarc now in use in theatres.

At the present time there are on the market a number of transformers which are being used with the 20-ampere Mazda C projection lamp, but which are not recommended, although they are cheaper than the compensarc described above. They do not contain a variable resistance in the primary circuit to take care of fluctuation in the line voltage, nor do they include an ammeter. Thus the operator is not in a position to know whether his lamp is burning at above or below normal current. It is necessary in any control apparatus which is used that the primary or the secondary circuit contain a variable resistance or reactance in order to take care of voltage fluctuation in the line and the variation in the voltage of individual lamps. Furthermore, it is necessary to have an ammeter in the secondary circuit in order that the operator may know when the lamp is burning at normal current. It is very important that the Mazda C lamps be held at their rated current. In order to take advantage of all the light possible the filament is operated at a temperature close to its melting point. Any marked increase in current delivered to the filament materially shortens the life of the lamp, and any decrease in current delivered to the lamp is followed by loss in light on the screen.

Field for Mazda Lamp Projection.

From the above discussion it will be noted that the Mazda lamp for motion-picture projection can be used to the best advantage only when installed in connection with recommended mirrors, condensing lenses, regulating equipment, and—if possible—projection lenses. In general, wherever alternating-current arcs are at present in use the 20-ampere lamp will, when properly installed, project pictures equal to or better than the arc lamp, with a considerable saving in operating cost; it will replace direct-current arcs of up to 35 amperes capacity. It may be used for either motion picture or stereopticon projection work. A satisfactory picture can be projected with the Mazda C lamp with a throw of from 75 to 90 ft. The permissible width of the picture to be projected will, of course, be affected by the character of the screen used in the theatre.

The simplicity of the Mazda lamp is an important feature of its use on motion-picture machines; once it is placed in the machine it requires no attention from the operator. The position of the filament is fixed, and there is no travel of the light source. The high degree of uniformity of illumination on the screen, the entire absence of flicker, and the absence o deposits on the condensing lenses, are prominent features, all o which contribute to the satisfactory reproduction of motion pictures.

R. P. Burrows.
J. T. Caldwell.

Patent News.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 6d. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane London, W.C.

The date in brackets is that of application in this country; o abroad, in the case of patents granted under the Internationa Convention.

Panoramic Cameras.—No. 119,516 (Oct. 1, 1917).—The invention relates to cameras of that type in which the lens moves during exposure so as to cover the entire sweep of the horizon at a single exposure. The improved camera is so constructed that when i rests upon a horizontal support, it reproduces the entire dome o the sky from the horizon to the zenith. When inverted and suspended, as from a flying machine, it serves to photograph the entire landscape on all sides of the position at which it is located the picture extending from the horizon to a point immediately below the camera's position, thus covering the whole field o vision. An object of the invention is so to position the film in regard to the lens that objects appearing upon the picture will be shown in their true relative positions and so that by applying a suitable scale to the surface of the picture the accurate distance of such objects can be determined.

To this end, the invention consists in arranging the sensitized film in the form of a cone, the lens being disposed with its optica centre in the axis of such cone and its optical axis at an angle to the axis of the cone. During exposure, the lens is revolved about the axis of the cone and projects the image on to the film through a slot in a revolving shutter moving with the lens.

The camera comprises a box or casing 1, which is preferably cylindrical. This has a suitable bottom 2, having an opening therein, across which opening extends a bar 3, access being had to the interior of the casing through such opening on each side of the bar. This is to enable the spring drum *a* to be grasped by the operator so as to wind the spring. However, in practice, other means for winding the spring may be provided.

In the upper part of the casing is formed a chamber having a conical bottom 4, which bottom serves as the film support. Th film, which consists of a flat, circular disc with a sector cut away is laid around the inside of the conical support 4 with its uppe edge engaged under lugs, and with the edges abutting or slightly overlapping.

Fitting in the conical chamber above mentioned is a hollow inverted, cone-shaped structure 5, formed of sheet metal. Thi structure has a conical surface 6, conforming to the shape of th film support 4, and spaced slightly therefrom, and is provided with a top 7. This top is extended beyond the structure 5, s as to form a closure for the film chamber, the edges of the top being turned down to form a depending annular flange 9. Thi flange fits into a similarly shaped annular groove 8, forme around the inside of the upper edge of the casing 1. This flang and groove arrangement forms a light-tight joint so as to protec the film.

The lens 10 is mounted at the centre of the top 7, with its optical centre z in the axis $p—r$ of the conical film support 4. The centre z of the lens is also located on the horizontal line $z—n$, which passes through the upper edge of the film x. The lens is set at such an angle that its optical axis $l—m$ is perpendicular to a generator of the cone forming the film support 4. Since this film support is a right cone, the generator of which is at 45° to the axis, it follows that the optical axis of the lens is inclined 45° to the horizontal. A cap 11 may be placed over the lens tube when not in use.

In order to facilitate setting the lens at the angle indicated, and in order to ensure a free and unobstructed sweep of the horizon, the top 7 is preferably provided with a groove, or depression, in front of the lens and with a corresponding ridge behind it.

The conical wall 6 is provided at a point directly opposite the lens 10 and in the optical axis thereof, with a slot. This slot is triangular in form, tapering from its maximum width at the upper edge of the cone to a point at the centre, so that the edges of this slot constitute true rectilinear elements of the conical surface. On each side of the slot preferably extend ribs, which project towards the surface of the film and tend to prevent the spreading of light passing through the slot. The conical surface 6 and slot constitute an arrangement in the nature of a focal plane shutter, as will be readily understood.

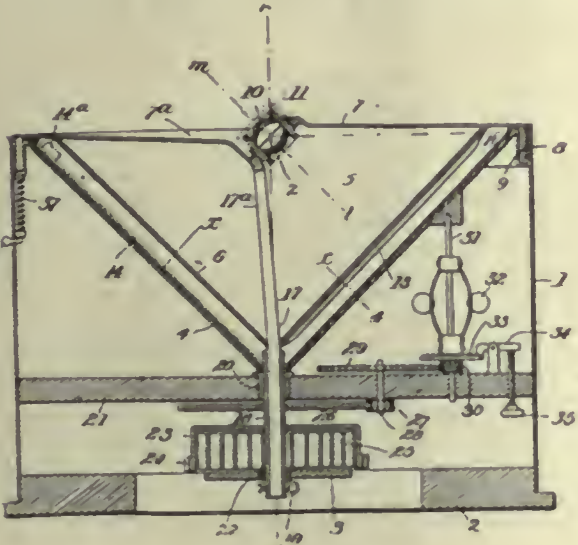

Fig. 1.

In order to protect the film from light entering the lens after the cap has been removed and before it is desired to make an exposure, there is an auxiliary shutter or shield 14. This is in the shape of a sector of a cone.

The conical member 6 and its associated parts are rigidly mounted upon a central shaft 17, which coincides with the axis of the cones 4 and 6, and the upper end of which is offset laterally, as indicated at 17ª, so as not to interfere with the proper projection of the image by the lens 10. The lower end of the shaft 17 passes loosely through a hollow shaft or sleeve 18, which projects slightly above the conical support 4 and extends down through the bottom 2.

Loosely journaled on the shaft 18, inside of the casing 1, is a spring drum 23, having on its outer surface ratchet teeth 24, adapted to be engaged by a spring pressed pawl (not shown), and thus held against rotation. Inside the drum 23 is a coiled spring 25, having one end attached to the drum and the other end attached to the shaft 18. Secured to the shaft 18, is a relatively large gear wheel 26, which meshes with a pinion 27, carried by a shaft 28, journaled in the bar 21, to the upper end of which shaft is secured a relatively large gear wheel 29, which meshes with a pinion 30, secured to a shaft 31. This shaft is rotatably mounted in suitable bearings and carries a centrifugal governor 32, to the lower end of which is attached a braking disc 33. On this disc bears a brake shoe 34, the position of which can be regulated by means of a thumb screw 35, set into the bar 21. The arrangement above described constitutes a well known speed regulating device for governing the timing of the exposure.

The operation of the invention so far described may be briefly stated as follows:

A suitable film having been placed in position on the conical support 4, and the spring 25 having been wound, the camera is ready for operation. It will be understood that the shield 14 or auxiliary shutter is normally disposed immediately beneath the slot 12, so as to protect the film from light entering the slot. When it is desired to make an exposure, the operator depresses the button 39, and thus releases the member 5. The tension of the spring then causes the member 5 to revolve and immediately afterwards the slot 12 moves past the edge of the shield 14 and the exposure begins. The movement continues until the member 5 has made a complete revolution, such movement being retarded by means of the centrifugal governor and brake. During this movement, the entire horizon is presented to the lens, and the slot 12 sweeps over the entire surface of the film, thus impressing upon such film the images projected by the lens.

As the revolution of the member 5 nears its completion, a leaf spring engages a lug and shifts the shield 14. This movement covers up part of the film which has already been exposed and uncovers that portion which was formerly protected by the shield. Frederick William Mueller, 1631, Ashland Avenue, Baltimore, U.S.A.

Exposure Calculators. No. 120,310 (January 25, 1918).—The invention relates to an exposure diagram for the calculation of the proper period of exposure of photographic plates, or the proper amount of flashlight powder to be used, and is characterised by the fact that the various factors which need consideration for an exposure are represented graphically on squared paper in as many different co-ordinate systems as there are factors in the calculation, and this is executed by following the lines of a squared net from curve to curve until the result is attained.

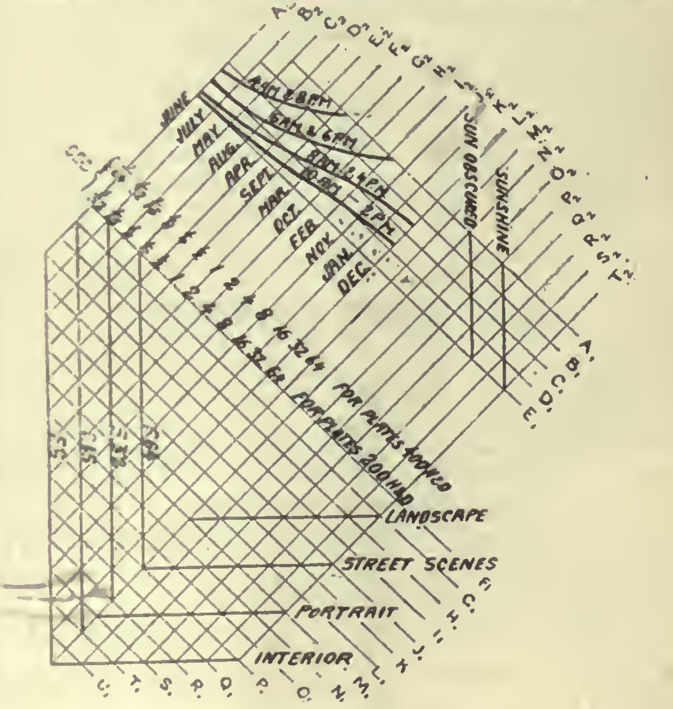

Fig. 1.

Diagrams according to the invention are shown in the drawing.

In Figure 1 the following factors are taken into consideration: The month, the hour, the state of the sky, the nature of the object, the size of the diaphragm and the speed of the plate.

The divisions in the squared net A_1 B_1—A_2 B_2—are assumed to represent the logarithms to the factors, so that, for instance, the distance from 1 to 4 is equal to the distance from 4 to 16, with the result that the different factors except the curves for the hour are represented as straight lines at an angle of 45° with the squared net.

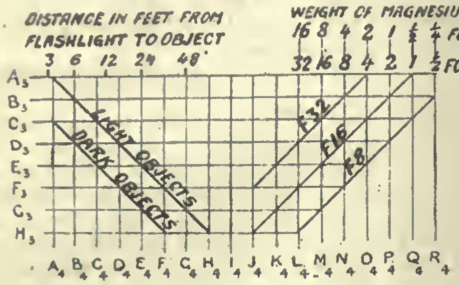

Fig. 2.

The method of using the new diagram will appear from the following example:—

In the month of November at 2 p.m. (sun obscured) it is desired to take a photograph of a landscape with diaphragm *f*/16 and plate speed 200 H. and D. (Hurter and Driffield.)

In order to find the time of exposure the thin line under the name of the month November (J_2) is followed upward to the right until the curve upon which 10 a.m. and 2 p.m. is printed. The line D_1 is then followed from this point downward to the right until the line which is marked "sun obscured." The thin line Q_2 is then followed downward to the left until the line marked "landscape." Then the thin line J, is followed upward to the left until the line marked *f*/16. Then the thin line D_2 is followed upward to the right, and the time of exposure, in this case ¼ second, is taken out in the row of numbers that corresponds to plate-speed 200 H. and D.

Figure 2 is a diagram for calculating the amount of magnesium to be used for photographs taken by flashlight. The method of using this diagram will appear from the following example:—

At a distance of 24 feet a photo is to be taken of a light object with a diaphragm of *f*/16 and a plate speed of 200 H. and D.

From the point marked 24^1 on the distance scale the thin line E_4 is followed downward to the line marked "light objects." From this point the line E_3 is followed to the right to the line marked *f*/16. Then the thin line M_4 is followed upward and the weight of magnesium, in this case 16 grammes, is taken out in the row of numbers corresponding to plate speed 200 H. and D.—Holger Nielsen, 102, Sologade, Copenhagen, Denmark.

Trade Names and Marks.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

Pompey.—No. 384,061. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. The Portsmouth Photo Co., Limited, 8, Arundel Street, Portsmouth; photographers and photographic dealers.

REGISTRATIONS RENEWED.

Zenith (label design).—No. 269,658. By Ilford, Limited, in 1905. (Class 1.)

Zepa.—No. 267,579-80. By the White Band Chemical Co., in 1904. (Class 1.)

Auto-Pastel.—No. 268,609. By the Autotype Company, in 1904. (Class 39.)

Negasys.—No. 269,567. By Honghtons, Limited, in 1905. (Class 8.)

New Books.

Puppies and Kittens.—Mrs. Carine Cadby has added a third to the delightful books for children, to which Mr. Cadby's photographs give a very realistic gusto. The predecessors of the present little book were fairy stories made, as every fairy story should be, to seem true. "Puppies and Kittens" is a set of four chapters on animals, pleasant chat of their ways, interesting and without the obvious effort to be instructive which so effectually disgusts the average child. The photographs of puppies, kittens, chickens, and spiders' webs are a real accompaniment to the text. Those who have bought "A Doll's Day" and Finding a Fairy" will need no advice to buy "Puppies and Kittens" as a present for a child. Those who have not can be recommended to buy all three. The publishers of the book are Messrs. Mills and Boon, 49, Rupert Street, W., and its price is 2s. 6d. net.

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Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Wednesday, January 1.

Croydon Camera Club. Members' Lantern Slide Evening.
Ilford Photographic Society. "A New Leaf." T. H. B. Scott.

Thursday, January 2.

Hammersmith (Hampshire House) Photographic Society. "The Photographer's Pencil." C. A. Hackman.
Hull Photographic Society. Gramophone Entertainment. F. W. Doughty.

CROYDON CAMERA CLUB.

Last week there was a "print display," the Armistice apparently acting as an incentive to that honest heart-to-heart criticism so much employed and enjoyed by the foremost critics of the club. Whether the exhibitors equally enjoy the bashing is another question, but the Croydon code compels expressions of gratitude for valuable and salutary lessons afforded. Mr. Harpur was in fine form, but having no pictures of his own on the walls no note of unqualified appreciation was struck.

There are certain degenerate souls among photographers who prefer a practical hint, however modest, to tons of good advice in the art elevation business. To such, a print shown by Mr. H. Allen (who in its production admittedly only acted as a mechanical and unpaid operator to his wife) would have appealed. He illustrated that, with luck, *genre* child studies are not beyond the capacity of a single 2,000 c.p. half-watt lamp with diffuser in front. For quality, softness of gradation, and modelling, daylight could hardly have bettered it.

A point raised by Mr. Allen is also worthy of attention by those who use a single half-watt lamp with diffuser or diffusers in front. For busts, etc., he finds that to secure soft modelling two diffusers are requisite, one being placed close to the head, but the two unduly prolong exposure. He prefers to use a fairly large diffuser close to the lamp, and places on it a small piece of cardboard adjusted to prevent direct light from the filament reaching the face of the sitter. This dispenses with a second diffuser, excellent modelling is obtained, and exposures are considerably reduced. The idea was first suggested to him by Mr. Basil, who, using an arc and umbrella reflector, employs a piece of card in the same way for local shading. The two cases are, of course, not quite analogous. In Mr. Allen's case a disc of fabric of sufficient translucency not to arrest the rays altogether might be preferable.

The previous week Mr. H. Guy Johnson gave a most interesting and practical lecture on "Illumination and Illuminants," mainly devoting his attention to the electric light. He dealt largely with the distribution of light, often neglected, with consequent loss of efficiency, and pointed out that this is a factor quite apart from the design and construction of the lamps. Practically, the Holophane Company is the only British concern which has given the matter scientific consideration, and their refracting system is highly efficient, and can be adapted to nearly every requirement. Some striking slides from negatives of interiors taken at night by electric light controlled by the system were shown, and the comparative absence of halation was remarkable. Londoners will shortly have an example of the system at work on a large scale, for Oxford Street is to be lit with half-watt lamps in Holophane globes.

In reference to the half-watt lamps, most are aware that the filament is extra stout, and wound into a spiral, so close as to be almost touching, also that the bulb is filled with an inert gas which by convection deposits the products of filament evaporation mainly in the neck. But the gas fulfils another important function by its pressure on the filament, which reduces its rate of evaporation, and allows the filament to be run at a much higher temperature than would otherwise be possible. The gain is more marked in high current than in low current half-watt lamps, but in all cases the colour quality of the light is improved. There is, he said, about the same difference in intrinsic brilliancy between a half-watt and an ordinary metallic filament lamp, as there is between the latter and a carbon glow-lamp. In another respect the contained gas in the half-watt lamp is bad, as it tends to conduct heat away from the filament and waste energy, but its beneficial influence in the direction first indicated largely outweighs this drawback.

If only an electric supply is available for illumination, he strongly recommended for any work involving critical vision the use of an old-fashioned carbon glow-lamp placed close to the work, instead of a metallic filament lamp. This advice revived recollections of a photographic experiment made by a member of the club some time ago, which proved that the light from glow-lamps markedly fluctuates in intensity when run on alternating current. Carbon lamps showed this effect least of all, which supports the conclusion of the lecturer arrived at independently. Anything likely to affect the eyesight is of the utmost importance, and the prudent retoucher compelled to work at night will take no unnecessary risk by discarding altogether electric glow-lamps on alternating supply. The matter is one which only data can settle, and the dicta of doctors is of little value. By a curious coincidence the lecturer unintentionally illustrated the intermittent character of the light from a 400 c.p. half-watt lamp in the club room which is supplied with alternating current. To show the formation of white light by pigment colour primaries, he ran a "Newton disc." The disc had rather a marked band where two colours joined, and this apparently revolved in opposite sense to the direction of actual rotation.

He also dealt with many aspects of projection arcs, and gave a useful tip for clubs who employ such, and have experienced trouble with carbons, as has been sadly the case at Croydon during the war:—Try one of the cinematograph supply houses, who are not likely to stock unsuitable carbons. Among other things, Mr. Johnson threw out hints as to probable advances in various directions in the near future. The "Point-o-lite" is being greatly improved; focus-lamps are likely to be extended in application; and an electric lamp variable in candle-power, but without variation in efficiency at any candle-power, is promised. Although the lecturer did not mention it, the ordinary type of metallic filament lamp is receiving attention. The filament, though wonderfully strong considering all things, is open to improvement in homogeneity. By passing a prepared filament through a coil kept at intense heat, crystallisation is established in the filament, and at a certain rate of travel becomes continuous, the filament in effect turning into one long crystal, and homogeneity is secured. Increased strength, and the ability to withstand higher temperatures than the ordinary metallic filament result.

Mr. Johnson deprecated for several reasons the standard pressure of 200 volts being adopted in this country. In America 100 and 110 volts are standards, and in practice are more economical, especially in the case of large installations. He had also found here variations in the pressure in the mains which would be most unusual in America. Bully for you! This poor old country has a lot to take lying down. For instance, our effete Board of Trade would faint at a suggestion of 150,000 volts to be carried by bare wires, yet in some parts of America this pressure is considered quite normal, and it is rumoured the inhabitants think nothing of lighting cigarettes off the "Corona." Mr. Johnson had some reason for his remarks on the fluctuation of voltage, as a difference of 11 volts had been occasionally observed on a 200 volt circuit. The following figures in this connection are interesting: With a tungsten filament lamp a drop of 5 per cent. below normal voltage results in a decrease of candle-power of 17 per cent. and the wattage nearly 8 per cent., the life of the lamp being about doubled. A rise of 5 per cent. above normal voltage increases the candle-power nearly 20 per cent., and the wattage about 8 per cent., and halves the life of the lamp.

A most hearty vote of thanks was accorded the lecturer on the proposition of the president, Mr. A. F. Catharine, who proudly sported throughout the evening a box of matches fully half-plate size, an ostentatious display of wealth hardly in the best of taste.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

FOR DEALING WITH THE CANVASSING PEST.

To the Editors.

Gentlemen,—Permit me to correct a misprint contained in my letter in your issue of the 20th. "If photographers generally would write" should read "would unite."—Yours faithfully,

MAURICE W. MEDCALF.

The Studio, Mexborough,
December 21.

BRITISH PHOTOGRAPHIC LENSES.

To the Editors.

Gentlemen,—Your correspondent "Dubitant" in your issue of December 13 voices queries which seem to be much agitating the mind of the photographic public in particular now that everybody is showing an interest in the reconstructive period of our industries. He refers to the old legend of pre-war German superiority both in glass and in lenses, and even seems to hint at the possibility of America assisting in the dependence of English manufacturers on foreign sources of supply for their raw materials.

To one who has been behind the scenes of both glass and lens manufacture during the war, the fallacy of these fears is apparent, and I should like, if you will allow me, to take this opportunity of contradicting it.

The optical industry has had very great and important demands made upon it for war purposes, and under the control of the Ministry of Munitions, has expanded beyond recognition both as regards production of difficult optical glasses and finished instruments.

It was early realised that quality, as well as quantity, in these matters was of vital importance if our fighting services were to be efficiently equipped, and the great efforts made to this end resulted in improvements, which, before the war, would have been deemed impossible in so short a time. Not only this, but the careful revision of factory practice increased the rate of output with a minimum of skilled labour, and rendered repetition methods possible as soon as a new design was approved and placed to quantity production.

The photographic lens played a far more important part in "winning the war" than the public generally realised. The information derived from aerial negatives was both a means of destroying the enemy and saving the lives of our own men, and the finer its definition the greater its capacity for this work.

Since from the air the earth represents an enormous flat chart at infinity, the importance of perfect definition to the margin of the plate was essential, and this, judging by the comparative tests which have been made between English and captured German lenses, has been attained—with an equally large aperture—*in greater perfection by English manufacturers using English glass* than by the Germans.

As the Ministry of Munitions—alive to future needs—have arranged for an enormous quantity and variety of optical glass to be made for commercial purposes, there would seem no reason to suppose that this achievement will not be maintained in peace time; or for "Dubitant's" fear that English lenses in future will contain—to quote his apt phrase—"a wrapped-up testimonial to the Germans."—Yours faithfully,

C. G. HETHERINGTON, Capt.

Dec. 18.

◆

PHOTOMICROGRAPHIC SOCIETY.—The next ordinary meeting will be held on Wednesday, January 1, 1919, at 7 p.m., at King's College Bacteriological Laboratories, 62, Chandos Street, W.C., when F. Martin Duncan, F.R.M.S., F.R.P.S., will lecture on "Some Macroscopic and Microscopic Studies of Insectivorous Plants." Visitors will be heartily welcomed, and cards of invitation may be obtained from the Hon. Secretary, J. G. Bradbury, 1, Hogarth Hill, Finchley Road, Hendon, N.W.4.

Answers to Correspondents.

SPECIAL NOTICE.

In consequence of general reduced supplies of paper, as the result of prohibition of the importation of much wood pulp and grass, a smaller space will be available until further notice for replies to correspondents.

Moreover, we will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

The full questions and answers will be printed only in the case of inquiries of general interest.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

M. K.—The best book for the making of the lecture on photography is "Photography of To-day," by Chapman Jones, obtainable from our own publishers, price 8s. post free.

E. D.—You can get a lantern objective from any of the firms dealing in lantern requisites, such as Messrs. W. Butcher and Sons, Ltd., Camera House, Farringdon Avenue, E.C. The cost now should not be more than about 10s., or you could easily get one second-hand.

B. K.—There is no need for you to register, and consequently no need to mark your stationery unless you have at any time had another name than your present one. We believe all restrictions on photography are removed, but you had better apply at your local police office. It is impossible for us to say whether a camera can now be sent to you from New York.

G. W.—(1) An enclosed arc lamp would probably be the most useful in so confined a space. You could probably get one secondhand for from £3 to £5, and to this you must add the cost of wiring, which a local electrician would estimate for. (2) The 5 in. portrait lens is rather too short in focus for postcards; a 6½ or 7 inch euryscope or anastigmat would be better. The 10 x 8 would do for heads only.

S. B.—There were some sketches of cloud forms designed for inserting into enlargements by knife work on the negatives in the handbook, "Retouching," by Arthur Whiting, which perhaps you can still get from Messrs. Iliffe, but we should think the best thing would be to get a few cloud negatives such as those made by W. Green, of Berwick-on-Tweed, either from this firm or from any of the large dealers.

H. W.—(1) The only kind of paper we can think of is that made for the Photostat. This, used with a yellow screen, would serve for making contact copies from typewritten matter. (2) The non-orthochromatic quality of bromide paper renders it unsuitable. Possibly a very slow gaslight paper would yield passable results, but we cannot say from trial. (3) "Modern Reproduction Processes," by Duchochois (Hampton and Co., 2s. 6d.).

W. H.—(1) Inverted incandescent to the number of from 18 to 24. Two lamps are put on the market. One is the "Howellite" of Messrs. Griffin, Kingsway, London, W.C.; the other is the "Powerful" of Messrs. Kodak, Kingsway. (2) The fastest plates you can get and the maximum aperture of lens, preferably not less than f/4. (3) Under conditions as in (2), exposures will be from 4 to 8 seconds. (4) From 5s. to 10s.

E. C.—You will find your room rather short for full-length portraits, but with a lens of about 7½ ins. focal length you will be able to manage. Of course, you must have a larger one, say a 12 in. for heads and half-lengths. If the windows are fairly large you should be able to do a good deal with daylight, and for artificial light about three 1,000 c.p. half-watt lamps will answer well. You can get a booklet giving full particulars of lamps, reflectors, etc., from the General Electric Company, 67, Queen Victoria Street, E.C.

G. C.—If the cards will not lie flat in the developer we are afraid there is nothing for it but to refer the matter to the makers. It is very unusual to find gelatine cards refusing to lie flat when a number of them, say a few dozen, are developed in an ample quantity of developer together. We suggest that you should try putting the cards in rapidly face down in the developer, one on top of the other; the upper cards then keep the other ones flat. If you do this, and keep putting the bottom cards on to the top we think you will find no ill effects, such as irregular development.

J. H. P.—There is, unfortunately, no standing custom of the trade in regard to payment for bank holidays or for periods of illness, but we think that on the strength of the written engagement to pay you during a week's holiday you have good ground for claiming such payment in respect to a week of the time you have been ill. We believe the Order of the Ministry of National Service restricting the starting of new retail businesses is still in force, though probably it is not very rigidly administered. For information you should apply to the Minister of National Service, 84, Westbourne Terrace, Paddington, London, W.

A. M.—The "Atmos" or half-watt lamps are now generally preferred to arc lamps for new installations of electric studio lighting. They require no attention after once fixing, and if a number of smaller candle power bulbs are fitted give a better diffused light. Four 1,000 c.p. lamps give sufficient light for all ordinary work. You can get a special booklet, free, from the General Electric Company, 67, Queen Victoria Street, London, E.C. A point that must be specially observed is that they are burned at their full voltage, as a slight drop below this will make the exposures much longer; it is well to point this out to your electrician.

S. L.—It is impossible to give you any idea of what it will cost to fit up an apparatus such as you want, since you do not say by what system you wish to work. We are of opinion that any apparatus without a condenser, unless you have an enclosed arc or mercury vapour gridiron lamp, is impracticable for professional work up to 24 x 20, as the exposures are far too long, especially with dense or yellow negatives. The most practical way is to procure an ordinary enlarging lantern with 8½ in. or 8¼ in. condenser fitted for incandescent gas. You can copy very well by the light of two upright mantles with tin reflectors to shade the light from the lens and throw it upon the original. We cannot understand your second question. What do you mean by paper negatives for making enlargements opaque? If you will make it clear what you require we will endeavour to help you. Any of the big dealers will supply you with the enlarging lantern, or, perhaps you could buy a condenser and make the body yourself.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as the acceptance of "returns" by a publisher is now prohibited by the Government. It is therefore necessary in order to ensure the regular delivery of the "B. J." each week to place an order definitely with a dealer, newsagent or bookstall clerk, or to send a subscription to the publishers.

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VOL. XII.

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PHOTO-MICROGRAPHS IN COLOUR.

(Communication No. 50 from the Research Laboratory of the Eastern Kodak Company.)

While the ordinary black-and-white lantern-slide or print is quite satisfactory for the reproduction of the appearance of a diatom under a microscope, or for the specialised study of sections, it fails to give that appearance of reality which is so valuable when demonstrating the appearance of microscopic objects for teaching purposes. The student who is accustomed to the stained section under the microscope, finds it difficult to recognise the appearance of the section when presented in monochrome, even when only one stain is present in the section. For the teaching of history, entomology, pathology, and botany, the use of lantern-slides which resemble the original section in colour is a great advantage. The only alternatives, which give equally good results, are the projection of the slide itself by a projection microscope, an operation which always presents considerable difficulty, or the use of a number of sections and microscopes, so that the students can examine the sections during or after the lecture.

The reproduction of stained sections in colour is not nearly so difficult an operation as the photography of most natural objects in colour. Great exactness of colouring is not necessary, it being only necessary to show the distinction between the different parts of the section as brought out by tho counter-staining, and the bright stains are easier to reproduce by dyes than natural colours. Moreover, anyone who undertakes photo-micrography, will have a considerable amount of skill in manipulation, and any worker who can prepare stained sections must have experience in the use of dyes, so that it would seem that there should be a wider field for the application of colour in photo-micrography than in most other branches of photography.

Many sections will show an examination only one colour, and in these cases only one negative is made, which is printed by the process to be described presently, and stained either with the same stain as that used for the section, or with a suitable dye of the same colour. Most sections, however, are stained with two different stains, and in this case two negatives are made through two suitable filters, and from these two coloured slides are prepared which are then registered together face to face. In very difficult subjects presenting a number of different colours, it may be necessary to make three negatives for the three-colour process, and to print from these three positives, which are registered together. In practice, however, this is very rarely required, and one or two plates are all that are needed.

Let us take the two-colour process as typical. The method of work is to choose filters which absorb one of the colours as much as possible and transmit the other, the two filters being necessarily complementary to the colours used for the stains, and after making two negatives through these two filters, to make prints in bichromated gelatine, and stain the prints from the negatives in colours corresponding to the two sections.

Thus, suppose a section is stained red and green. Make two negatives on pan-chromatic plates, one with a red filter, which will cause the green to appear as clear spaces in the negative and will not record the red, and the other with a green filter, which will cause the red to record and not the green. Then make prints from these in bichromated gelatine, staining the print from the red negative with the original green stain, and then that from the green negative with the original red stain, and superpose the prints. It will be found that lantern slides made in this way will reproduce the original appearance of the slide in a most satisfactory manner.

Making the Negatives.

The filters required can be chosen from the set of M filters prepared by the Wratten and Wainwright division of the Eastman Kodak Company. These can be obtained either as gelatine film, in which case they should be protected from damp by the fingers by binding them up between two pieces of glass, or cemented between two sheets of white optical glass by means of Canada balsam, the cementing both protecting the filters and rendering them more transparent. The set includes the following filters :—

Name of filter.		Visual colour.		Spectral transmission.
A	...	Scarlet	...	From 5,800 to red end
B	...	Green	...	,, 4,600 to 6,000
C	...	Blue-violet	...	,, 4,000 to 5,100
D	...	Purple	...	,, 3,800 to 4,600 and ,, 6,400 to red end
E	...	Orange	...	,, 5,600 to red end
F	...	Pure red	...	,, 6,100 to red end
G	...	Strong yellow	...	,, 5,100 to red end
H	...	Blue	...	,, 4,200 to 5,400
K	...	Pale yellow	...	Luminosity screen for orthochromatic reproduction with artificial light.

By using these filters in pairs the spectrum can be divided up into approximately monochromatic portions.

The choice of the filter for any section is, of course, of critical importance. This is best decided by visual trial under the microscope, the filters chosen being those which most nearly absorb one colour and transmit the other. A few examples may be of value: Photographing a section stained with Delafield's hematoxylin and precipitated eosine the A filter shows no trace of the eosine and gives a good, strong negative of the hematoxylin. The B and C filters together record the eosine and hematoxylin both fully, and when positives are made and stained with a blue dye and a red dye the resulting slide will be excellent. For photographing methylene blue and eosine the F filter and B and C together give good results. With basic fuchsine and aniline blue the A and C filters are satisfactory.

The plates used are the Wratten Panchromatic plates, the exposures when using the filters being determined by trial or by calculation, the factors for the Wratten filters being given in the booklet on Photo-Micrography published by the Kodak Company. There are, however, two points of importance in colour work which do not apply to the same extent when single photographs are being made: One is that the illumination must be as even as possible and must not vary from exposure to exposure; the Nernst lamp is more satisfactory than an arc, though if the arc be carefully regulated its crater can be used with good results. Any unevenness between the two plates will result in a patchy appearance in the colour slide. The second point is that the ratio of exposure for the two filters must be correct so that the two negatives show the same detail in the shadows of neutral portions of the section. It often seems difficult to judge of the correctness of the ratio in photo-micrography, but every care must be taken to have the two negatives as much alike as possible. The exposure must be kept on the short side in order to secure transparent negatives, and for the printing process discussed hereafter a much softer negative must be made than for printing on paper or on lantern plates, so that the time of development should not be above two-thirds of that recommended for the plates for ordinary photography.

Printing.

In the course of the experimental work done in the Research Laboratory upon this subject various methods of preparing the colour pictures have been tried, including a number of those used in colour photography, but the most satisfactory method was found to be printing on bichromated gelatine by arc light, the method being as follows:—

Lantern plates (Seed or Standard lantern plates will be found satisfactory) are sensitised by bathing for five minutes in a 2½ per cent. solution of ammonium bichromate containing 5 c.c.s. of .880 ammonia to a litre. The sensitising may be done by artificial light as the plates are practically insensitive when wet. The temperature of the bath must not be above 65° Fahrenheit, or reticulation of the gelatine is very likely to occur. The bath may be used repeatedly, but should be filtered before use.

The plates as they come from the sensitising bath are rinsed for two or three seconds in clean water to remove superfluous bichromate solution, and are then carefully drained in a rack until the whole surface is free from streaks, after which the backs are cleaned and drying hastened by a gentle current of dust-free air from a fan. The current of air must not be violent, otherwise streaks of uneven sensitiveness will occur. A gentle current of air which will dry the plates in about an hour is very satisfactory. Drying must take place in darkness or in a safe orange light.

The plates will remain good for several days if stored face-to-face in plate boxes.

Printing the Plates.

The plates are exposed *through the glass* under a negative to the light of an arc lamp, the average exposure being about three minutes at 18 inches distance. It is sometimes convenient to use the arc in a projection lantern, removing the projection lens and exposing through the condenser, which must be clean. Either this or the naked arc is satisfactory, but the printing cannot be done by daylight, as when printing through the glass there will be too much diffusion to give sharp images.

The plates are developed by rocking in trays of water at about 120° Fahrenheit until *all* soluble gelatine is removed. Under-exposure is indicated by the high-light detail washing away, and over-exposure by the film being insoluble to too great a depth. The plates are next rinsed in cold water, fixed in acid hypo and washed free from the hypo; they are then ready for staining. Throughout the foregoing operations the delicate film must not be touched with anything other than liquids.

Staining.

For staining, a 1 per cent. solution of dye is used containing 1 per cent. of acetic acid, the dye being selected to simulate most closely the original stain of the section. The time of dyeing is not important, but must be long enough to saturate the gelatine reliefs. The following are suggestions for the imitation of some of the best known stains, though in slides made from two negatives the dyes must be selected so that *in combination* they most closely simulate the original section:

Stain.	Suggested Dye.
Aniline Blue	Pinatype Blue F (Hoechst)
Congo Red	Naphthol Red
Eosine	Eosine or Naphthol Red
Delafield's Hematoxylin	Water Soluble Nigrosine
Basic Fuchsine	Fast Red B
Leishmann	Water Soluble Nigrosine
Methylene Blue	Toluidine Blue
Picric Acid	Chrysoidine S.

These are regarded only as suggestions, and a little experimental work will soon show which dyes will give the best results. If necessary, a dye can be washed completely out in dilute ammonia and another dye tried.

When printing two-colour slides from double negatives one of the negatives must be reversed so that the film is towards the light; thus, we shall have in printing, first, the negative film, then the negative glass, then the glass of the lantern plate, and finally the positive bichromatised emulsion. In order to get sharp results either a condenser must be used or the arc must be a good distance away, but the reversal is necessary in order to be able to mount the dyed plates film to film to make the slide.

For slides for which the two colours are not sufficient the three-colour process can be used, the three negatives being made through the A, B, and C filters, and positives from those made by the method described above dyed, the one from the red-filter negative in Neptune Green, the one from the green-filter negative in erythrosine, and the one from the blue-filter negative in any yellow dye such as acid yellow, or, if the pinatype dyes are available, pinatype red, blue, and yellow may be used.

When mounting, the blue and red prints are mounted face to face, so that they are in contact, and the yellow print is mounted outside with its film in, so that the yellow film is separated from the red and blue films by one thickness of glass. The effect of this upon the differentiation will not be visible in a lantern.

C. E. K. Mees.

DECENNIA PRACTICA—COLOUR PHOTOGRAPHY.

THE AUTOCHROME PROCESS—DEFECTS AND REMEDIES.

Black Spots in Autochromes.—G. S. G. uses a solution of iodine, 1 gm.; potass. iodide, 3 gms.; in distilled water, 50 c.c.s. as a stock solution to be kept at hand for the removal of black spots from finished Autochromes. A few drops of the solution are mixed with water, and the mixture, which acts slowly, applied with a fine brush, working from the centre of the spot. If the solution acts too rapidly, it is removed with a fragment of blotting-paper. After this retouching, the plate is washed for one minute, placed in the acid fixing bath for a few seconds, washed again for two minutes, and then dried.—"B.J." Colour Supplement, Dec. 6, 1912, p. 55.

J. McIntosh recommends that to avoid frilling on "Autochrome" plates the final drying should be done on a whirler as soon as the plate has had its five minutes' washing.—"Phot.," September 10, 1907, p. 222.

J. McIntosh prefers to deal with subjects of strong contrasts of light and shade by doubling the exposure and halving the time of the first development. He finds it best to dry the finished plates on a whirler.—"Phot.," September 10, 1907, p. 221.

By using the beeswax and resin mixture fairly warm only and immersing the plate for 1-16 inch for five or six seconds frilling is certainly and conveniently prevented.—"Phot.," September 24, 1907, p. 260.

A. E. Bawtree has suggested a melted mixture of beeswax (2 ozs.) and resin (1 oz.) as a means of saving "Autochome" plates liable to frill. The plate is dipped edge by edge to the depth of about ¼ of an inch in the mixture before development.

R. Child Bayley prefers to use dammar varnish as an edging, the plate being dipped to about ¼ inch depth in the liquid. It is developed after allowing about fifteen minutes for the edging to harden.

Autochromes of Bluish Tint.—E. Dillaye, in a report to the Gaumont Co., ascribes the blueness observable in some autochromes (1) to under-exposure, (2) to leakage of white light, and (3) to certain conditions of lighting of the subject. Snow scenes and seascapes, particularly when lighted from a sky in which blue largely predominates, would seem to require a light-filter other than that usually employed for the autochrome plates. Esculine as a light-filter was not satisfactory, as it cut out the violet completely, and the blue remained too crude. Better was a supplementary screen dyed with picric acid. The writer suggests the use of a set of screens increasing the exposure from one and a quarter to two times, the deepest being suitable for the rendering of snow-covered mountains or glaciers.—"Phot.," March 17, 1908, p. 224.

Remedying Colour Effects in Autochrome Plates.—G. A. Le Roy, commenting on the tendency of autochrome transparencies to be too bluish when under-exposed, and too reddish when over-exposed, prescribes a remedy for these defects in the shape of weak staining baths capable of imparting to the plate a slight coloration, the complementary of that which it possesses. Thus a bluish plate is immersed for a few minutes in a weak bath of yellow, such as Poirier's Orange II. Such a bath must be of the requisite dilution, and must not be allowed to act too long, or the result will be disastrous.—"Bull. Soc. Fr. Phot.," Nov., 1907, p. 473; "B.J." (Colour Supplement), Feb. 7, 1908, p. 11.

Correcting Colour Rendering.—Leopold Cust directs that in the correction of faint prevailing tints in finished autochromes great improvement can often be effected by binding it up with a cover-glass having a faint tint of the colour complementary to that which is in excess. Thus, if too blue, use a pale yellow cover-glass; if too red, a pale green one; if too orange, a pale blue. A very slight tint is all that is generally required; the beginner is apt to produce cover-glasses tinted far too deeply.

The following hints as to how to produce these cover-glasses may be acceptable to those who possess early attempts at autochromes, which, for one reason or another, are unsatisfactory. By applying a series of cover-glasses of various depths of the required tint to the finished autochrome, it can at once be seen whether it is worth while to unbind it and to rebind with a tinted cover-glass. Assuming that quarter-plate is the size which is worked, take, say, a dozen old quarter-plate glass negatives which have never been varnished and which are free from scratches on the film. Soak them in cold water for half-an-hour, and place them, one or two at a time, in a dish containing one part of A to five parts of B:—

A.—Saturated solution of potass. ferricyanide.

B.—Hypo. bath; ordinary strength (4 ozs. to the pint).

(When mixed this bath will not keep, and if required to be used for more than ten minutes a fresh bath must be prepared.)

Hold the negatives in the celluloid horseshoe-shaped clips, as the ferricyanide is a poison.

In a short time all the metallic silver image will be dissolved, when the plates must be well washed, preferably in a tank with syphon discharge. After this hold them under water in a dish, and gently wipe the film side with a piece of wet cotton-wool to remove any scum or streaks, which sometimes will be found on the film. If the plate should have a white deposit over it, caused by chalky deposits from hard washing water, place in a dish containing ½ dram of hydrochloric acid to the ounce of water, and wash again for a short time, preferably in a dish of rain-water. In places where there is lime in the water it is best to use rain-water for making up the following staining baths, otherwise the yellows in the cover-glasses are apt to be too brown in colour, and also any chalky deposits are thus avoided.

For Yellow tint :—	
Diamond dye, yellow	16 grs.
Rain-water	8 ozs.

For Green tint ;—	
Diamond dye, yellow	12 grs.
Diamond dye, light blue	2 grs.
Rain-water	8 ozs.

For Blue tint :—	
Diamond dye, light blue	4 grs.
Rain-water	8 ozs.

For Pink tint :—	
Diamond dye, eosine	2 grs.
Rain-water	8 ozs.

The Diamond dyes can be obtained in 3d. packets at an Italian merchant's shop, or from the makers, Wells, Richardson and Co., 31, Snow Hill, London, E.C.*

The plate, held in the clip, is now placed in the required dye, and it is as well to stain several plates at the same time, using a deep quarter-plate porcelain dish and the whole of the 8 ozs. of solution; the plate should be rocked during the staining process, and an immersion of 10 to 20 seconds will generally impart a deep enough tint; it should then be rinsed for a moment or two in a bath of clear water and stood up on edge on a piece of blotting-paper to dry. After applying the green dye do not rinse, or all the colour will be washed out, as the green dye seems to penetrate the film very slightly. If too deeply dyed, for they are darker when dry, immerse in a bath of ammonia and water, 3 drops or so per ounce, when the dye will be rapidly discharged. Rinse slightly and set up on edge to dry. The yellow stain is best, if neutral, or slightly acid, and if made up with water at all alkaline, a drop or two of acetic acid should be added to the bath of water in which the plate is rinsed.—"B.J." "Colour Photography" Supplement, Feb. 2, 1912, p. 5.

Viewing Filters for Autochromes.—Baron von Hübl has given formulæ for the making of compensating filters to be used when viewing Autochromes by various artificial lights, or when using arc light for the projection. A flat glass plate is coated with a dyed gelatine solution, the stock solutions required being (a) gelatine solution, 1 in 15; (b) patent blue solution, 1 in 1,000; (c) rose Bengal, 1 in 100.

(1) Viewing filter for petroleum or gaslight and electric light: 40 c.c. of (a), 5 c.c. of (b), 3 c.c. of (c), 30 c.c. of water.

(2) For incandescent gaslight: 40 c.c. of (a) 3 c.c. of (b), 5 c.c. of (c), 30 c.c. of water.

(3) For electric arc light: 40 c.c. of (a), 4 c.c. of (b), 4 c.c. of (c), 30 c.c. of water. In every case coat 5 to 6 c.c. of dyed gelatine solution per square decimetre.

When projecting Autochrome pictures it is advisable to use a filter which has been dyed with solution No. 3, but which is even a little lighter. The colours will thereby be more correctly reproduced; they lose the reddish tinge; green-blue and yellow are better separated, and the loss of light is not too apparent. It is also noteworthy that the delicate yellow tones are not destroyed by the use of the blue filter, but on the contrary appear much more distinct. The yellow disappears into the white ground with yellow illumination.

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* Johnson's Photo Tints are also found most suitable for the purpose.—E. B.J.A."

but if this light is made white by the blue filter the yellow is better recognisable. It is not advisable to coat the slides with the blue film, as they easily produce a bluish tinge, which is not the case when the blue filter is placed before or behind the condenser. If we chance to look at the illuminated screen (upon which the slides are being projected), say perhaps when the pictures are being changed, it looks as if it were illuminated with white light, and the slide which follows appears bluish in the colourless parts, although, as a matter of fact, this is white and the sheet was yellowish before. This is not the case if the light of the lamp remains corrected by the blue filter, because then its yellow light cannot lead us astray.

In the place of the filter a bluish projecting screen could be used, but the loss of light would be the same, as it is a matter of indifference whether the superfluous red and green rays are absorbed in the lantern or by a pigment on the screen.

Blue filter No. 3 should be used if it is desired to prepare by electric arc light the colour-sensation negatives for three-colour reproduction of an Autochrome, because the reddish lighting lends the whole picture a general tinge which would be evident in the reproduction. If, however, a blue screen is placed in front of the original it appears illuminated by white light, and the resulting three-colour negatives are then exactly the same as those obtained by daylight.—"Wien Mitt.," Feb., 1909, p. 49; "B.J." (Colour Supplement), Apr. 2, 1909, p. 26.

Bluish Shadows in Autochromes.—In cases where neutral tones appear bluish, *e.g.*, when the shadows are illuminated by the blue sky, as occurs in snowscapes in sunshine and in views taken in a weak light (in all cases when insufficient exposure is given), G. Winter advises a compensating light filter made with echt-rot and filter yellow K in place of the tartrazine and saffranine given by von Hübl. A formula for a normal filter is as follows:—

Gelatine, 1 : 10	40 c.c.s.
Filter yellow, 1 : 200	14 c.c.s.
Echt-rot, 1 : 2,000	14 c.c.s.

For a filter containing a higher proportion of yellow the formula is:—

Gelatine solution, 1 : 10	40 c.c.s.
Filter yellow, 1 : 200	14 c.c.s.
Echt-rot, 1 : 2,000	14 c.c.s.

In each case 7 c.c.s. of the dye-gelatine solution is used per square decimetre of the glass to be coated.—"Wien Mitt," Dec., 1910, p. 568; "B.J." Colour Supplement, Feb. 3, 1911, p. 13.

Correction of Autochromes with Tinting Glasses.—Baron A. von Hübl, in a paper on the correction of a prevailing tint in Autochromes by means of a supplementary cover glass, points out that so long as the tint to be corrected is slight, a tinting glass is a satisfactory means of remedying a defective colour rendering. —"Wien Mitt.," Aug. 25, 1913, p. 481; "B.J." Colour Supplement, Sept. 5, 1913, p. 33.

Projection of Autochromes.—Leopold Cust advises those who project their Autochromes by electric arc or limelight to make a few unbound screens, dyed to various tints, chiefly blue. They should be placed behind the Autochrome, in the groove of the lantern-slide carrier, and should not be protected by a cover glass, or there will not be room for them in the groove, but simply masked round the edge with a narrow strip of black paper, in order to protect the surface of the film from getting scratched; they may, of course, be varnished as an extra protection.

The use of a pale blue tinter makes the yellow tones even more distinct, the green-blues and yellows being better separated in the picture, for, in the ordinary way, the yellows disappear into the white ground with yellow illumination, but, by interposing a pale blue tinter to make the light of projection white, the yellows show up better, and the reddish tinge, often apparent, is suppressed. Regarding the term "yellow illumination" used above, it must be remembered that all artificial light, even the arc, is deficient in blue rays, and hence tends towards a yellowish illumination.

In making a selection from one's Autochromes of those for projection, it is best to choose such as are thin rather than dense. With a good limelight jet, of the ejector type, using hydrogen from the house gas-supply and oxygen from a steel cylinder, well illuminated Autochromes may be shown at home, to a few people, upon a screen 3 ft. or 4 ft. square.

With the ejector type of jet the regulator on the oxygen cylinder should be set to a pressure somewhat higher than usual, say to that of 20 inches of water.

The screen upon which the pictures are shown is very much improved by having a surface of aluminium paint instead of white. Messrs. Carl Zeiss, of 13, Great Castle Street, London, W., supply a very convenient one, mounted on a stand, but a home-made one is used by the writer, and, possibly, a short description of how to prepare it may be useful to some readers. Procure a piece of cold rolled sheet iron, having a surface free from rust or dents (Messrs. R. Melhuish, of Fetter Lane, London, E.C., can supply it of a size 3 ft. by 3 ft., for 3s.), and give it two coats of thin white paint, made up with just the pigment and turpentine, or what painters call "sharp" colour. When dry, rub the surface down with fine glass-paper, in order to remove any small inequalities, and apply a couple of coats of good so-called "aluminium paint." These latter vary very much in quality; that made by W. N. Froy and Son, of Hammersmith, can be recommended. In applying the second coat let the brush, which is preferably of camel's hair, flat, and about 2 inches wide, be worked at right angles to the direction of he brush marks on the first coat. Quite possibly the surface will not be satisfactory even after the second coat, in which case some turpentine should be poured into a saucer, some of the aluminium powder, which will be found to have settled to the bottom of the tin of paint, added to it, and, the brush being constantly kept well moistened with this, the whole surface, beginning with the top portion, must be gone over again. The brush should be worked downward all the time, not across, and the aluminium powder will be found, as it flows slowly downwards, to settle evenly. The screen should be stood up vertically during the whole operation of painting, not laid flat. The secret of success is to have the aluminium paint quite fluid; it may be thinned down with about a third of its bulk of turpentine, for, if too thick, streaks and brush marks are sure to result.

The sheet-iron screen may be made to remain flat and rigid by placing it in a square wooden frame. Procure four pieces of deal, of which the finished sizes, for a 3-ft. screen, will be 3 ft. 7½ ins. long, 4 ins. wide, and ⅞ in. thick. With a grooving plane cut a narrow groove, 5-16th of an inch deep, centrally along the inside edge of each, and mortise them together to form a frame. Into this groove the finished iron screen is slipped and the tenons of the frame wedged up, the four pieces composing it having first been stained a dull black, not varnished.

It may be added that the use of an aluminium screen entails a limited angle of view, and consequently spectators who are at all much to the side will only see the views poorly illuminated.

Unless the lantern be fitted with an alum trough, Autochromes should not be allowed to remain in for even a minute, or there is much risk of them being damaged by the heat. When an alum trough is employed, the liquid itself may be faintly tinted with a blue dye.—"B.J." "Colour Photography" Supplement, Feb. 2, 1912, p. 5.

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A Dufay Screen-Plate Process.—The difficulty of getting coloured lines in exact juxtaposition and of sufficient fineness for the purposes of colour photography has, according to *La Nature* for November 10, been completely overcome by M. Louis Dufay, who is associated with MM. Lumière. The method is to pass a thin celluloid film between two rollers warmed sufficiently to render the celluloid plastic. One of the rollers has very fine circumferential parallel grooves of square section cut upon its surface, and thus the celluloid has similar grooves formed upon it. The film is then coated with a coloured transparent fatty mixture and wiped off after the manner of wiping an etched plate after inking and before taking an impression from it. The film is next treated with an alcoholic solution of another colour, and this penetrates the exposed surface of the celluloid. Thus there are formed alternating coloured lines in perfect juxtaposition, which may be of a fineness as great as thirty lines to the millimetre. If the film is thin enough to permit it without introducing the possibility of parallax, the other side of it may be similarly treated, either simultaneously or afterwards, so that two other colours may be introduced, or these may be added in the form of any microscopic figures that may be preferred. Three double pairs of colours are given: (1) yellow and blue, red and green; (2) yellow and red, blue and orange; (3) red and blue, yellow and violet.—*Nature.*

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SOME PECULIARITIES OF COLOUR AND THEIR BEARING ON PHOTOGRAPHIC WORK.

(A lecture delivered before the Royal Photographic Society.)

Light falling upon an object to be photographed is reflected from the surface, but we are concerned not merely with the light which is reflected at the actual surface of the object, but also with the light which penetrates a little way into the substance and is reflected as it were from the inside of the material. The depth of penetration of the light may be very slight, but provided that the light penetrates the object at all and goes a little way through the substance, that light is subjected to the effect of selective absorption. If the whole of the visible light is reflected, then we say that the object is white, but it may very well happen that some of the constituents of the light are absorbed, and then we speak of the light which is sent back to the eye as coloured, because it is white light less some of its coloured constituents.

Colours produced in this way by selective absorption have varying properties, and I will show an experiment to demonstrate some of the differences that exist. We take a solution of potassium permanganate, and place it in the path of a beam of light, and in the path of another beam we place a solution of one-tenth the strength. There is a difference in brilliancy and also in colour. By stopping down the lens through which the brighter beam is passing we bring our two images roughly to the same brilliancy, and then it is seen that there is a decided difference in colour: one is a blue while the other is pink. Here is a case where the colour of the light which has passed through an absorbing medium differs in quality with the strength of that medium.

If we now place in the path of one beam a solution of picric acid and in the path of the other beam a solution diluted ten times with water, we shall see that while the dilute solution allows more light to go through, the change in colour is not so great, and if we reduce the amount of light passing through the lighter solution, we see that the difference in colour produced by the effect of dilution is but slight.

If a piece of yellow film is placed half-way across the spectrum, then it will be seen that the reason why the dilution of the picric acid solution produces so little change in its colour is that yellow is opaque to blue and to violet light, while it is, on the other hand, very transparent to the remaining constituents of white light. In such a case, when by selective absorption one constituent of the white light is completely removed and the remaining constituents are allowed to pass in considerable quantity, then not much change is obtained in the colour, whether the solution is strong or weak.

We are aware, of course, that all ordinary colours are produced by removal of some of the constituents of white light by selective absorption; but it does not follow that this occurs very often. In a large number of cases the absorption is more or less gradual, and then the effects are more complicated.

The fact that yellow is a compound colour and is produced by the abstraction of the blue-violet constituents of the white light, and that the removal of those constituents is very often complete, is a phenomenon which has many bearings on photographic work.

Safe-lights, which are used in the wet-collodion process, are a bright yellow. Wet plate work is conducted under modern conditions of process engraving in a room which is well lighted, and this is possible partly because of the efficiency of the safe-lights. It is easy to construct safe-lights which remove the whole of the blue-violet and ultra-violet light, and allow to pass all those brilliant red, yellow, and green rays which give to the eye the effect of yellow. The efficiency of orthochromatic filters also is affected considerably by this point. Ordinary yellow filters for orthochromatic work are very efficient. The amount of light of longer wave-length—the red and green light—which they obstruct is very slight, but by using the dye in suitable quantities one may grade down the blue light just to the extent which is required.

I show now a photograph of some buttercups on a wet collodion plate as used by the process engraver. The brilliant yellow flowers are rendered as black, the reason being that the petals of the buttercups do not return to the camera any of the light to which that plate is sensitive, and this point is, perhaps, a little remarkable because it is only occasionally that one gets the whole of the blue and violet light so completely removed that it cannot produce any effect at all upon the ordinary photographic plate.

Now we come to a group of subjects which show this effect most markedly. These are objects which are varnished with a yellow varnish. In these cases the actual varnish lying on the top of the wood or the oil-painting very often plays a most striking part in the result. The varnish is itself somewhat yellow, but the light which falls upon it is partly reflected at the topmost surface. One thus gets a considerable amount of surface reflection, much of it being regular. That light is white, it therefore contains the blue and violet constituents which affect the ordinary photographic plate, so that an object of this type, when photographed on an ordinary plate, is recorded chiefly by part of the surface-reflected light. If, however, we photograph by the longer wave-lengths, we get a record of what is under the yellow varnished screen.

I have one case in which the object can only be photographed by light which passes through it. It is a piece of old Kauri gum containing some insects. The rendering with the ordinary plate shows no sign whatever of the insects. It is the complete removal by selective absorption of all the light to which the ordinary photographic plate is sensitive which produces this result. When, however, this same object is photographed by the longer wave-lengths of red, yellow, and green, then we are able to obtain a record of what is inside the substance, and the insects are plainly visible. There is always that difference between the two cases. When one is photographing an object by reflected light, then whatever kind of light is used for taking the photograph, one can always obtain some sort of result, but as in the photography of insects in amber, where the light has to penetrate through the material, if seletcive absorption by a yellow-coloured material occurs, then it may mean that the light which is ordinarily used for photographic work is removed. Although some of these instances may seem commonplace, I emphasise them because the peculiarities of yellow are not those of many colours.

Let us now turn to the question of greens, which do not act in quite the same way as yellow. If we take any green dye and place it in the path of the light, we shall find that, while it produces its effect by selective absorption—that is to say, by the removal of some of the constituents of the white light—there is, nevertheless, the difference that it does not transmit the whole of the green light.

That is quite a common characteristic of green, more so than one might at first suppose. If the greens that occur in nature are examined it will be found that in practically every case they do not return anything like the whole of the green light which falls on them back into the air, and in many cases, especially if we were to try the experiment with such green leaves as are now (December) available, we should find that the reflection of green light only amounts to 4 or 5 per cent. In no case does the reflection of green from the green leaf amount to more than one-third. Yellow and blue make green, but the green filters for photographic work do not admit of the same efficient construction as do the yellow filters, and the reason is that we have not in the case of blues a colour which acts in the same way. In the case of the blues and the greens we do not have a complete absorption of any one colour and an efficient transmission of the remaining colours. We are here dealing with a class of colours which are apt to change according to their strength.

I show a photograph on the screen of a landscape in which the leaves on the trees give no evidence of detail upon the exposed under-surfaces, whereas the upper surfaces are only too well exposed. Here we are dealing with the effect of surface reflection. The leaves are spread out in the way that nature has provided so as to catch as much of the sun's rays as possible. The solar light, falling on this leaf, is reflected to some extent at the surface, and that surface reflection, comprising as it does every kind of light which the sun has sent to the leaf, has among its components just those particular wave-lengths which affect the photographic plate, and so this is well exposed. But the light which penetrates the leaf has undergone selective absorption, and it so happens that almost the whole of the light which affects the photographic plate has been removed by that selective absorption. If we photograph the same object again, using light which comprises green among its components, we shall be able to photograph the detail of the undersides of leaves, and in this case we no longer have the violent contrast between the surface reflection and the dark underside of the leaf, because the green light is being photographically recorded.

There are two cases of selective absorption in marked contrast. We have, on the one hand, the case where some light absorbed is absorbed very completely, and other light is transmitted almost in its entirety. On the other hand, we have the more common case where no one constituent of the white light is completely absorbed and no one constituent completely transmitted. It is very fortunate—indeed, there is probably a great natural law behind it—that it is in some of the useful cases that there is complete absorption and high transmission. Complete absorption is only combined with high transmission in those cases in which it is the shorter wave-lengths which are absorbed and the longer wave-lengths which are transmitted. In all other cases we have nothing so definite. A. J. Bull.

DECENNIA PRACTICA—COLOUR PHOTOGRAPHY.

Under this heading we apply to the various branches of colour photography the processes of collection and arrangement accorded to some fifty departments of ordinary photography in the "B. J." during 1916. These extracts are from issues of the "British Journal Almanac" of the years 1906 to 1915, and the present series of epitomes thus resuscitates and brings together in compact form much useful information, otherwise scattered through nearly a dozen volumes.—Eds. "Colour Photography" Supplement.

EXTRA-SENSITISING AUTOCHROME PLATES.

It requires to be pointed out that the formulæ for extra sensitisers which are contained in the following abstracts all belong to the pre-war period. It is therefore necessary to say, when including them in this series of reviews, that the enemy dye-stuffs pinacyanol and pinaverdol have been replaced by British-made dyes known respectively as "Sensitol Red" and "Sensitol Green." These date from January, 1917, whilst quite recently other dyes of service in sensitising and filter making have been introduced also by the Ilford Company.

Extra Sensitiveness in the Autochrome Plate.—J. Thovert has advised the use of extra dye baths for Autochrome plates. For exposure by daylight a bath of pinachrome, 1 : 200,000, is used for two minutes, and the plates rinsed in clean water for one minute. A suitable compensating filter for these extra-sensitive plates is made as follows:—A stock solution is prepared of 1 gm Filter Yellow K (Hoechst) in 150 c.c.s. of water. 1 c.c. of this solution is added to 9 c.c.s. of 4 per cent. gelatine solution, and the mixture flowed over the glass plate in the proportion of 5 c.c.s. per square decimetre.

For exposures by magnesium flashlight a suitable sensitising bath is erythrosin, 1: 1,000,000, used for two minutes, and the plates briefly rinsed. In making the compensating filter a 1 per cent. solution of Filter Yellow K is prepared, and 1 c.c. added to 20 c.c.s. of 4 per cent. gelatine, the mixture being flowed over glass in the same proportion as before—namely, 5 c.c.s. per square decimetre. The formula for the light-filter applies only to the Lumière flash-powder.

Owing to the thinness of the film the bathed plates dry very quickly without heat. The bath is mopped off the back of the plate with a tuft of cotton wool.—"Phot. Couleurs," May, 1909, p. 95; "B.J." (Colour Supplement), July 2, 1909. p. 53.

Extra Sensitising of Autochromes.—In order to obtain Autochrome plates of sensitiveness sufficient for instantaneous exposures Ch. Simmen subjects them to a further colour-sensitising, as already suggested by Thovert. The dyes found best for this purpose are pinaverdol, pinacyanol, and pinachrome, these three being used together in proportions which require to be found by preliminary trial. An exact formula cannot be given; in some cases the proportion of pinaverdol to pinacyanol is 8 : 1, in others 7 : 4. It is thus necessary to start first with a mixture of 1 of pinacyanol to 3 of pinaverdol, and to add more of the first if the greens are predominant, or of the second if the reds predominate. Equilibrium in this respect having been obtained, one part of this bath is mixed with one part of pinachrome solution of the same strength, namely, 1 : 1,000.

In working, sensitising with an aqueous solution is not to be recommended—the plates do not keep so well, and frequently stains are caused. The best bath is one made up with 30 per cent. alcohol, which strength has been found to be without injurious effect upon the varnish of the plates. The solution is rendered distinctly alkaline by addition of 1 c.c. of ammonia of 22 deg. strength per litre, a small proportion, yet sufficient. The composition of the bath is thus as follows:—

Distilled water	66 c.c.s.
Ethyl alcohol, 90 deg.	33 c.c.s.
Ammonia, 22 deg.	0 1 c.c.
Dye (1 per cent. solution in alcohol)	2 c.c.s.

The above quantity will suffice for four quarter-plate Autochromes sensitised in succession. This bath may be made in bulk, and will keep indefinitely in well-corked bottles filled with the liquid and placed away from light.

Each time before use it is strengthened by addition of ½ c.c. of the dye solution and ½ c.c. of 1 per cent. ammonia; *after use*, a few c.c.s. of 30 per cent. alcohol are added to make up the volume lost, the bath being then filtered through cotton-wool. The variations which can creep in in preparing the bath do not affect the results to an appreciable extent. It is important to observe the greatest cleanliness and freedom from dust, and it is well to use the dishes only for this special purpose, rinsing them beforehand with acid permanganate solution, and keeping them constantly covered with a piece of card during use. The sensitive plates are immersed in the bath, allowing 100 c.c.s. for each quarter-plate. The time of immersion is exactly five minutes, irrespective of the temperature. The bathed plates are carefully drained and put to dry, with absolute exclusion of light. Perfect drying, essential to the process, was at the first one of the greatest difficulties of the process, but a very simple method was found in the use of a neutral fluffless blotting paper.—"B.J.," Colour Supplement, Sept. 2, 1910, p. 65.

Extra Sensitising of Autochrome Plates.—A. von Palocsay, in devising a means of further sensitising Autochrome plates, has endeavoured to prepare the sensitising bath with one dye only. Using pinachrome for this purpose, exposures can be considerably shortened, but at the expense of the colour rendering. The formula given below is, however, of service where red and orange predominate in the subject, green being absent. Thus, for autumn scenes and architectural subjects it may be of considerable advantage to those employing the Autochrome plate for pictorial purposes. The sensitising bath is made as follows:—

Water, distilled	200 c.c.s.
Absolute alcohol	50 c.c.s.
Pinachrome solution, 1 : 500	2 c.c.s.

The plates are bathed in this bath in complete darkness for two minutes, rocking the dish the whole of the time. They are then, without rinsing, put to dry in a proper cupboard. The time of sensitising should be kept as short as possible, otherwise the alcohol in the bath is liable to exert an effect on the varnish coating of the film. Quick drying is likewise important, and for this reason drying cupboard should be used.

A suitable filter for plates treated in this bath is the following of extremely pale greenish-yellow:—

Water, distilled	100 c.c.s.
Soft gelatine	30 gms.
Aesculine	15 gms.

One c.c. of this mixture is used for every four square centimetres of the glass to be coated. When the gelatine mixture has set, a cover glass is cemented down with Canada balsam in the usual way.

The exposure may be from one-half to one-third. A more correct colour rendering may be secured by using a yellower filter and giving a longer exposure.

Water	100 c.c.s.
Filter yellow solution 1 : 1,000	6 c.c.s.
Echt rot solution 1 : 15,000	1 c.c.

This gives correct colour rendering even of the greens, reducing exposures to the extent of about two-thirds of a second in place of a normal time of one second.—"Wien. Mitt.," Feb., 1911, p. 5; "B.J.," Colour Supplement, April 11, 1911, p. 29.

J. Thovert likewise recommends pinachrome used by itself as a colour sensitiser of Autochrome plates, which gives extra speed and may be used without elaborate methods of scientific control. The screen used with the sensitised plates is that sold by MM. Lumière for flash-light work with the Autochrome. The exposure is from one-quarter to one-fifth that usually given.

Sensitising is conveniently done by immersion of the plates for five minutes, at a temperature of 60 degs. F., in an aqueous solution of pinachrome, of strength 1 : 1,000,000, without subsequent washing. The following is the procedure:—Water is rendered slightly alkaline by addition of a minute quantity of ammonia, two or three drops of ammonia per litre. It is best not to use distilled water. This recommendation may appear paradoxical, but in this work it is often better to use ordinary tap water. The solution of pinachrome is made up at the time of use by adding 1 c.c. of a 1 : 1,000 alkaline solution of the dye to a litre of water. This bath is poured into a dish in which the plates are to be sensitised, and these latter are then introduced and left for five minutes with constant rocking. The bath being extremely weak, there is no occasion to be economical in using the solution. For example, it is well to work with a tank in which the plates can be placed vertically, since this allows of a very regular action, and of a number of plates being treated together.

After five minutes' immersion the plates are withdrawn and allowed to drain by standing them simply against an upright box or wall, placing their lower edges on a strip of clean filter-paper. After thus draining for two or three minutes, the face of each plate is wiped, and they are put in the drying cupboard. This latter is formed very simply from a closed light-tight box, on the floor of which is placed a dish containing strong sulphuric acid. The plates are stood, film outwards, against the sides of the box. If the box be kept in a perfectly dry state by charging it with a fresh supply of sulphuric acid the day before sensitising is done, the drying of the plates will take place very rapidly—in the case of four quarter-plates within an hour at a temperature of 60 deg. F. Drying by this method will always be satisfactory, even when the conditions or the temperature are less favourable, and there is, indeed, nothing to lose by allowing the plates to remain for several hours in the drying box. It may be added that in all this work absolute cleanliness is an essential condition of success, and one must avoid any contact with the emulsion throughout the process.

Stains after sensitising are due either to contact with the plates or in some cases to unequal action in sensitising or drying. Immersion in a vertical tank, draining and drying in an almost vertical position, reduce the occurrence of this species of defect to the minimum. One is practically certain, when working in the way above described, of obtaining, both with Autochrome and ordinary plates, a perfectly regular sensitising which is stainless and permanent.—"Phot. Couleurs," April, 1911, p. 81; "B.J." Colour Supplement, July 7, 1911, p. 47.

Extra-Sensitising of Autochrome Plates.—Ch. Simmen has given revised formulæ for the extra-sensitising of Autochrome plates by means of a mixture of pinaverdol, pinachrome, and pinacyanol (see "B.J.A.," 1911, p. 618). These three dyes are dissolved, one part of each, in 1,000 parts water, but it is found that, owing to variations in the commercial dyes, the proportion of each in the mixture requires to be varied somewhat in order to give a constant degree of colour sensitising. M. Simmen's formulæ are as follows :—

SENSITISING BATH.

A.—Water, distilled	66 c.c.s.
Alcohol, pure, 90 deg.	33 c.c.s.
Dye, 1 per cent. solution	1.5 to 2 c.c.s.
Ammonia	0.25 to 0.5 c.c.

The dye is a mixture of pinaverdol, pinachrome, and pinacyanol, in alcoholic solution, 1 part each per 1,000 parts. Sensitise four 9 x 12 plates in succession, giving each 5 minutes' immersion.

LIGHT-FILTER.

B.—Distilled water	100 c.c.s.
Gelatine, soft	10 gms.
Ammonia	1 c.c.
Glycerine	0.2 c.c.
Aesculine	0.2 c.c.

Use 1 c.c. for each four square centimetres of area. Or the following formula :—

B¹.—Distilled water	100 c.c.s.
Gelatine, hard	3 c.c.s.
Filter yellow K, 1 per cent. solution	2.5 c.c.s.

Use 1 c.c. for each 10 square centimetres of surface.

This method, which not only gives plates five times more rapid, but at the same time more transparent colour results, cannot fail to lead to a successful issue if it is carried out to the letter. The cost of the extra-sensitising is extremely small, not more than 2 centimes per 9 x 12 box.—"Bull Soc. Fr. Phot.," Dec., 1911, p. 403; "B.J." Colour Supplement, May 3, 1912, p. 17.

Extra-Sensitised Autochromes.—M. F. Monpillard points out that, apart from the shortened exposure, there is an advantage in the use of Autochrome plates extra-sensitised with the solution of M. Simmen when dealing with subjects containing purple. This is readily explained from the fact that there is used in the composition of the extra-sensitising bath the dye pinacyanol, which has the property of rendering the emulsion actively sensitive to the red up to 670 in the spectrum, whilst the colour-sensitiveness conferred upon the ordinary Autochrome by pinachrome ceases in its sensitising effect at about 640 in the orange. For this same reason whilst extra-sensitising of the Autochrome plate by means of the Thovert sensitising formula containing pinachrome has the advantage of increasing the general sensitiveness of the plate to a notable extent, it does not contribute appreciably to the improvement of the rendering of reds and violets. A recent test has clearly shown the correctness of this explanation of the beneficial effects as regards colour-rendering of the Simmen bath. In short, extra-sensitising of the Autochrome plate by the Simmen or Vallot formula, far from introducing a disturbance of the colour-rendering, empowers the plate to deal to a still higher degree of accuracy with certain colours.—"Phot. Couleurs," April, 1912, p. 77. "B.J." Colour Supplement, May 2, 1913, p. 18.

Extra-Sensitising of Autochrome Plates.—F. Monpillard points out that old hyper-sensitising solutions cannot be made to give good results by increasing the time of immersion of the plates. In such an old bath the greater part of the pinacyanol becomes inactive, and thus the plate is made more sensitive to yellow and green, but not to red.

For hyper-sensitising, therefore, a fresh solution should always be used. If need be, it can be made up some time in advance. In this solution several plates may be treated simultaneously or successively; but after use it should be unhesitatingly rejected. The time of immersion may vary within wide limits, but should never be less than three minutes.

The degree of dilution employed may also be varied, but it is preferable to keep to that which experience has shown to be the most favourable, namely, one part of the hyper-sensitising liquid to ten parts of the bath, including one part of ammonia solution. A greater dilution necessitates a longer immersion, and that it is best to avoid. In spite of the precautions taken in manufacture, Autochrome plates may contain minute holes in the film of gelatine, and the longer a plate with such a defect is left in contact with liquid the greater is the chance that the liquid may make its way through into the screen-plate coating, and produce stains.

Experience has shown that provided that the dilution and time of immersion remain the same, the results obtained by hyper-sensitising do not appreciably vary for differences in temperature from 46° to 60° Fahr. (8° to 16° C.).—"Phot.," January 20, 1914, p. 49.

Light-Filter for Hyper-Sensitised Autochromes.—F. J. Hargreaves finds that Autochromes made with the extra-sensitised plates have sometimes a general greenish hue, more especially marked in the shadows and on neutral tinted parts of the subject. The effect is more likely to show itself when using the last portions of a bottle of dye-sensitiser. A preventive of it is the use of the Wratten K1 light-filter in place of the light greenish-yellow screen of MM. Lumiere. It may sometimes happen in the regular use of the K1 screen for extra-sensitised Autochromes that a pinkish tint is produced, but, in portraiture particularly, such predominant colour is greatly preferable to the greenish tint.—"Phot.," October 21, 1913, p. 350.

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PRIZMA TWO-COLOUR CINEMATOGRAPHY.—Some months ago—in the "Supplement" of April 6, 1917—we were able to give, by courtesy of Mr. Alfred S. Cory, of New York, technical particulars of the four-colour process of colour cinematography introduced under the name of "Prizma," and yielding, as Mr. Cory reported from his personal observation, projection results of a very high degree of technical excellence. The original "Prizma" process was an additive method in which a series of four successive filters was used in taking the negatives, whilst in the rotating filter upon the projection lantern two filters only were used, although the projection filter was of special pattern, providing sectors (adjustable) of other colours than the two main ones of red-orange and greenish blue. We now learn from Mr. Cory, in the *Motion Picture News* of January 12 last, that a simplified form of the "Prizma" process has been the subject of a recent demonstration in New York. Apparently the distinctive features of the previous invention have been abandoned. It is stated that the colour-sensation negatives are taken on panchromatic film alternately through red-orange and blue-green filters, and from the negatives thus produced ordinary black-and-white positive film is printed. This film is then treated by special machines, so that each red-sensation image is dyed a transparent red, whilst the green-sensation images are similarly dyed transparent green. In other words, the film itself is provided with the colour which previously was supplied in the form of a rotating filter upon the projection lens. Thus the "Prizma" film in this form is projected at the rate of thirty-two or more pictures per second in any ordinary cinematograph lantern.

It is difficult to see wherein this process differs in principle from that of Kinemacolor, the patent rights in which some year or two ago were declared invalid on the ground of insufficient description of the division of the spectrum into the two sets of rays used in making the green-sensation and red-sensation sections of the film. The incorporation of the projection filters in the film itself is, moreover, altogether analagous to a process which was demonstrated in London in May, 1915, under the name of "Aurora," and was attributed to Mr. Friese Green, junr. In the "Aurora" process, the demonstration of which we witnessed, we had simply the two-colour method with the projection filter replaced by colouring on the back of the positive film.

So far as we can judge from Mr. Cory's description, the results obtained by the two processes exhibit pretty much the same technical character. The colour-rendering breaks down in places, and there is the liability to optical pulsation on the screen, and to a very pronounced flicker if the speed of projection falls off.

Altogether, it does not look as though the commercial prospects for additive processes of colour cinematography are very encouraging. We have still to wait for the ideal colour film which can be bought all complete by the yard and inserted for projection into the standard cinematograph lantern.

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DICHROIC FILMS FOR SELECTIVE TRANSMISSION AND REFLECTIVE OF COLOUR RAYS.

(We print below the substance of the specification of a patent (No. 110,089, Feb., 1917) granted to the Hess Ives Corporation. The object of the invention is to reduce the waste of light inherent to the use of transparent mirrors for the purpose of producing two or more images with a single lens. [illegible] claims which are detailed under "Patent News."—EDS. "B. J.")

The general object of the invention as compared with hitherto known means is to increase the effectiveness of the apparatus employed, more especially in its application to a camera, by reducing the amount of light lost, and consequently increasing the amount of light utilised in the taking of pictures, in materially reducing the time of exposure and thereby increasing the available range of subjects.

Where simultaneous images are involved, it has hitherto been proposed to employ an ordinary plate of glass, white or coloured, and arranged diagonally, so that a beam of light directed upon it is partly transmitted and the balance reflected, thus giving a separation of the beam into two components, which may be directed to different sensitive films for producing the simultaneous images; the reverse principle permitting the light from two images to be blended. A comparatively small percentage of the light is reflected—the bulk is transmitted—but this disproportion can be equalised by an extremely thin silver or platinum deposit, which decreases the transmission and increases the reflection, although absorbing a fraction of the light-energy.

The action of the transparent reflector is, at its first reflecting surface, to divide the white light into two parts, and it thereby divides each of the component colours—red, green, blue, *etc.*,—into two portions; so that eventually when the red portion of the light-beam, for example, reaches its destination, it has been reduced by the transparent reflector to a half or less of its original quantity, in addition to any other losses necessarily occurring in the apparatus. The immediate action of the transparent reflector is thus to throw away an exceedingly large percentage of the available light.

A principal object of the invention is to prevent such losses of light by employing, in both camera and projector, a dichroic optical instrument, or what may be more specifically defined as a colour selective transparent reflector, which would be substituted for the transparent reflectors hitherto used. The dichroic reflector is adapted to split the light beam and reflect an excess of one kind of light and transmit an excess of another kind, this action occurring at the surface of the instrument, and being independent of the subsequent interposition in the light-beam of colour screens.

This dichroic reflector is found to be much more effective than the plain glass reflector, and also more efficient than such substitutes as thin or partly silvered or platinised glass, none of which effects a resolution of white light into complementary components, but all of which throw away a large proportion of the available light.

In the drawings the thickness of the glass, and any refraction thereby, are ignored as negligible, the first glass surface being the reflecting one in each case. Also the incident light in each case is assumed to be white, as covering all possible circumstances, and the beam of white light is treated as composed simply of two complementary colours—red and green—or of three—red, green, and blue.

The nature and operation of the dichroic optical instrument may be first best explained by reference to figs. 1 to 4. In figs. 1 and 3, 10 is a glass reflector silvered or platinised equally to reflect and transmit, while in figs. 2 and 4, 11 is the dichroic or colour-selective transparent reflector. The beam of light 12 strikes the reflector diagonally in each case. Considering the beam as one of white light, it is made up of all of the constituents of the spectrum, but for convenience these may be grouped into two complementary components—12^a and 12^b, which, added together, constitute white light.

In fig. 1 the beam on striking the reflector 10 is partly reflected as to all its constituents, giving a weakened or half-strength beam 12^c, composed of a portion of the rays 12^a and a portion of the rays 12^b. The transmitted portion 12^d similarly comprises a part of 12^a and a part of 12^b. Therefore there is no colour selection, but merely a division of the entire light into two similar portions, one reflected and the other transmitted.

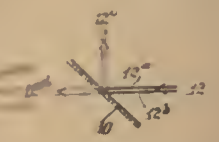

Fig. 1.

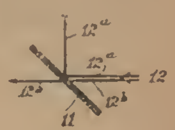

Fig. 2.

In fig. 2 the transparent reflector 11 is provided with a dichroic surface. If this were theoretically perfect the action would be as shown, the component 12^a being reflected *in toto* and the rays 12^b transmitted in *toto*, thus giving an effective colour separation. For example, the greens 12^a of the spectrum may be reflected and the reds 12^b transmitted.

In figs. 3 and 4 coloured screens or transparent coloured glasses 13, 14, are shown interposed in the reflected and transmitted rays.

Assuming 13 in fig. 3 to be a green screen, then the reflected portion of the green rays 12^a will pass through the screen 13, while the red rays 12^b will be cut off by it and wasted. Conversely as to the transmitted rays 12^d, the red component 12^b thereof will pass through the screen 14, as seen at 12^{bd}, while the green component 12^a will be cut off thereby. As a result, approximately speaking, the finally reflected rays 12^{ac} will consist of merely half the original green component 12^a of the white light, while the finally transmitted rays 12^{bd} consist of but half of the original red portion 12^b of the white light. Losses will reduce the eventual rays to still less than 50 per cent.

In fig. 4, however, the interposition of the green and the red screens 13 and 14 respectively effects no substantial cutting off of light, but only a rectification in case of a slight difference between the colour qualities of the dichroic instrument 11 and the screens respectively. Theoretically, therefore, all of the green rays 12^a are reflected from the instrument 11 and are transmitted through the screen 13, while the balance of the light is transmitted through the instrument 11 and screen 14, so that the finally emerging rays constitute, without waste, the entire make-up of the original white light.

These principles are applicable to the art of colour photography in specific ways or in an indefinite further variety of ways which will be readily suggested to those skilled in the art.

A dichroic optical instrument or colour-selective transparent reflector realising the theoretical operations and results above mentioned may be produced in various ways, of which those described are to be regarded merely as convenient examples.

One such mode of production is by the use of certain coal-tar dyes, preferably the alkaline or basic coal-tar dyes. A dichroic reflector made with a suitable coal-tar dye gives greater efficiency than one made, as mentioned below, from metallic gold. The coal-tar dye is preferably used in alcoholic solution, and in that condition applied to the first or front surface of a perfectly clean glass plate of suitable quality. The dye that is preferred is eosine, although fuchsine and other coal-tar dyes would be available, and good results have been obtained from di-bromfluorescinate of sodium mixed with eosine. Dyes of different colours would give different kinds of separation, but it has been found that, in any case, the sum of the reflected rays is in colour, substantially the complement of the sum of the transmitted rays. After flowing the plate with the solution it should be allowed to drain, and to dry in upright position, standing upon an absorbent material, such as blotting paper.

As a specific example, a solution may be employed containing about 20 grs. eosine to 8 ozs. alcohol. After flooding and draining as described, the drying may be allowed to proceed slowly in a calcium chloride box.

Dichroic coatings thus produced are found to be satisfactorily uniform, except the lowermost margin of the plate, which may be discarded. They are fairly hard and durable, especially in dry air, if protected from continuous exposure to strong light; if injured they are easily and cheaply replaced.

A coating so produced by the use of eosine will so act upon white light as to reflect a preponderance of green, giving an appearance like a hard, polished green metal, while likewise a preponderance of red is transmitted. This increases the speed efficiency of the camera, especially since red is the least actinic colour, and the recording of the red is the time-consuming operation.

Theoretical comparison may be made between the relative action of clear glass, half-silvered glass, and the eosine dichroic reflector as between the transmitted and the reflected portion of the light by the following table, which approximates the actual results :—

	Transmitted.	Reflected.
Clear Glass	90 R* 90 G 90 B	10 R 10 G* 10 B
Half Silvered Glass	50 R* 50 G 50 B	50 R 50 G* 50 B
Eosine Dichroic Reflector	80 R* 50 G 80 B	20 R 50 G* 20 B

Assuming the transmitted red and the reflected green light is to be utilised, the above table indicates that clear glass will give 90 per cent. of the red and 10 per cent. of the green light; half-silvered glass 50 per cent. of the red and 50 per cent. of the green light; eosine dichroic reflector 80 per cent. of the red and 50 per cent. of the green light. In each case losses will reduce the figures given, but the dichroic reflector clearly affords an increased proportion of the respective colours.

Another dichroic coating, less delicate and more durable, although not so efficient as the coal-tar dye reflector, is one on which, at the first or front surface of the glass plate, is deposited a thin film of pure gold. A properly-made dichroic reflector of this kind will reflect more than half of the orange-red light, and transmit more than half of the green light. The gold film should be exceedingly thin, and may be electrically deposited in vacuum.

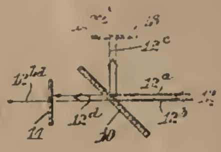

Fig. 3.

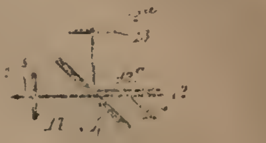

Fig. 4.

When a thin gold deposit is used as a dichroic reflector it may be employed in making up a compound prism, as has previously been proposed, the ruddy reflecting surface being used for sending light through a red screen, while the greener transmitted light is passed through a green screen.

Other practical applications of this invention will suggest themselves to those skilled in the art. Colour photography cameras are already known, wherein two or more separate negatives are simultaneously exposed through different colour screens, and such cameras have been frequently provided with one or more diagonal transparent reflectors, which transmit part of the light and reflect part to another plate. Where in such cameras it was desired to utilize only the first glass surface for reflection in order to avoid double reflection, and therefore double outlines, the transparent reflector was constituted of coloured glass as specified, and other expedients have been resorted to to prevent such double reflection. None of these means have involved or suggested the use of a dichroic reflector, and the reflected image in each case was simply a reduced percentage of all the constituents of the original beam of light. It is believed, however, that the present invention would be applicable in connection with hitherto known structures to effect an increase in efficiency therein.

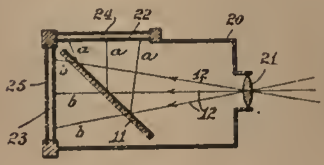

Fig. 5.

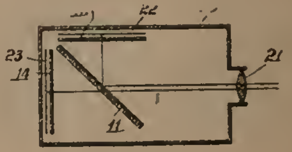

Fig. 6.

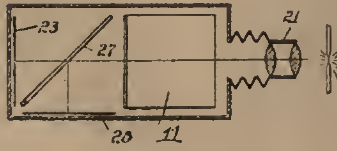

Fig. 7.

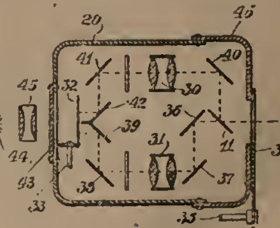

Fig. 8.

Simple forms of illustrative embodiments are shown in figs. 5, 6, 7, and 8 herein.

The colour photography apparatus of fig. 5 may be employed either for taking or exhibiting colour photographs. While truer colour effects may be reproduced on the tri-colour system involving the three primary colours—red, green, and blue—approximate results are attainable with two colours, which, for convenience, may be termed red and green, although obviously the colours might be different. In an apparatus embodying this two-colour system, the dichroic reflector 11 is enclosed in a box or casing 20, having a lens 21 at the front positioned to throw light-rays 12 diagonally upon the reflector. As in fig. 2, one of the colour components of the light will be reflected laterally to where it may be received upon a sensitive film 22, while the complementary portion of the light will be transmitted through the instrument 11 and pass to the sensitive film 23. In this way colour-selection negatives are obtained from which positives may be produced and the proper colours blended in any well known manner to give the true colours of the original object.

Considering the structure of fig. 5 as an exhibiting instrument either for viewing or projecting, the films 22 and 23 may be considered as positives and the walls 24 and 25 back of them translucent so that an observer or curtain in front of the lens will receive a combined colour impression.

The colour-selective screens 13 and 14 may be omitted as in fig. 6, but it is preferred to employ them. Thus fig. 6 shows a camera having the dichroic reflector 11, the screens 13 and 14 and the films 22 and 23 behind them respectively. In case of difficulty in securing a dichroic reflector giving exactly the shades of reflected and transmitted light desired, the screens 13 and 14 are of value as rectifying the light, or, in other words, sifting out such undesired rays as are not eliminated by the dichroic reflector. As illustrated in fig. 4, as compared with fig. 3, a greater amount of the respective coloured light will reach each of the films 22 and 23 with the dichroic reflector and screens, as in fig. 6, than would be the case with a plain or partially-silvered transparent reflector and screens as in prior known apparatus.

Obviously the colour screen 14 might be omitted by constituting the glass base of the dichroic reflector 11 of the proper colour, since that would effect the proper sifting or rectifying of the selected transmitted rays.

The art of motion pictures in colour is merely the art of colour photography applied to travelling films and intermittent shutters. In fig. 8 is shown a simple diagram indicating the use of the present invention for motion pictures in colour. Within the casing 20 is the dichroic transparent reflector 11, serving not only to separate the component colours of the light, but to displace relatively the images formed thereby. Instead of one lens in front of the apparatus, a pair of lenses 30, 31 in the separated light-beams may be employed, serving to focus the rays, which are eventually brought to the travelling film 32, forming images side by side on the film. Mechanism 33 for intermittently advancing the film, and a shutter 34 intermittently advanced by mechanism 35, will be suitably controlled in accordance with well known manner, so that the film travels between exposures and preferably remains stationary during exposures. The light displacing devices may include a pair of silvered mirrors 36, 37 between the instrument 11 and the lens 31 and another pair of mirrors 38, 39 between that lens and the film 32, and if both branches of the light beam are displaced, as is advisable in order to maintain equal optical distances, a silvered reflector 40 may cooperate with the instrument 11 to project one light portion through the lens 30, there being a pair of mirrors 41, 42 for displacing the light to the film 32.

In this operation an axial light ray entering the camera in front, is split, a preponderance of the green, for example, being reflected from instrument 11 and passing through lens 30 to one side of the film 32, while a preponderance of the red part of the light is caused to pass through lens 31 forming an image at the other side of the film. Operating the film and shutter in unison affords a series of paired colour-selective images capable of being reproduced by an exhibiting apparatus.

For exhibiting the pictures, the rear of the box 20 may be opened at 43 and a source of light 44 and condensing lens 45 properly placed to project a beam of light forward through the film 32. The light forms two beams, one for each image, and the two beams become displaced and then reunited and blended by the colour-selection reflector 11, so that each image thrown on the curtain is the sum of the two colour images. The instrument 11 may have a different character for projecting than for taking the pictures.

Motion pictures taken by the apparatus of fig. 8 might be projected without the use of the dichroic reflector 11, by removing a front portion 46 of the casing 20 and all of the optical devices in front of the lenses 30, 31, with the exception of the shutter 34, which latter would be replaced by a pair of shutters. The two lenses 30, 31, would throw their images on the curtain and with slight relative adjustment of the lenses, these images could be brought into coincidence so as to blend the colours properly.

It has been stated above that the described novel principles may be employed in a three-colour camera. In the camera represented in fig. 7, the rays of light projected inwardly by the lens 21 first encounter the dichroic reflector 11, which is inclined backwardly from the vertical at an angle of 45 degrees, so that it throws vertically upward a preponderance of green rays forming a green selection image, while allowing a preponderance of red rays to be transmitted. The transmitted rays also include a sufficient proportion of blue rays to make the desired photographic impression upon a blue-sensitive or ordinary rapid film. The ascending green rays may be rectified by a green glass before reaching the film that is to bear the green-selection image; neither this green glass nor the last-named film is shown in fig. 7. The transmitted rays, however, before rectification, encounter a vertical reflector 27 inclined at 45 degrees so as to reflect an image laterally to the blue-sensitive film 28, while the bulk of the light is transmitted and is suitably rectified in passing to the red-sensitive film 23 at the rear. It is preferred to constitute the vertical reflector 27 of yellow glass to prevent double reflection to the film 28. A dichroic reflector might be employed in place of the yellow glass 27, capable of transmitting the red and reflecting a preponderance of blue light.

To render the matter more clear and by way of explanation of the terminology in the claims, the following observations are made. It will be noted that with the dichroic instrument the reflected percentage of one component colour and the transmitted percentage of another colour, if added together, will total more than 100 per cent., and any optical instrument giving this result will comply with the main purposes of the present improvement. For example, suppose the instrument reflects 30 per cent. of all the green light and transmits 80 per cent. of all the red light, these two percentages total 110. Theoretically a clear glass could be thinly silvered so as to reflect 25 per cent. of all colours and, therefore, green, and transmit 75 per cent. of all colours and, therefore, red, but with such reflector the total of percentages can never exceed 100. By a preponderance of reflected and transmitted percentages, is meant such proportions as total more than 100 per cent. The dichroic reflector is, in a sense, a selector of colours, as contrasted with a mere coloured glass which eliminates undesired colours, thereby rectifying the light by subtraction. As has been explained, the present invention is more useful for the taking and recording of colour pictures, but since it can be used for combining or blending them for exhibition, the statement of claim is made to cover colour-photography apparatus broadly. The films 22, 23 and 28 of figs. 5, 6 and 7, and the two sides of the film 32 of fig. 8, may each be termed an image surface, and it may either be an image receiving surface in a picture-taking apparatus, or an image-bearing surface in a picture-exhibiting apparatus. In every embodiment it will be noticed that there is an image surface at each of the two opposite sides of the dichroic reflector, that is to say, the optically opposite sides, so that one carries or receives the transmitted image and the other the reflected image.

FADING OF AUTOCHROMES.—A New York engraving company tells the following experience in the "Inland Printer" as a warning to others in the trade:—They were given an Autochrome from which to make a set of three-colour blocks larger than the Autochrome copy. The colour record negatives were made by illuminating the Autochrome from the back with a flaming-arc electric lamp, the light going through a piece of ground glass before reaching the Autochrome. The exposures were, of course, prolonged, and before they were completed they found that the colour had faded out almost entirely from the Autochrome, being bleached out by the electric light. The customer threatened a suit for damages, claiming that the Autochrome was valued at a large sum of money. This engraving house will not receive Autochromes as copy hereafter.

DECENNIA PRACTICA—COLOUR PHOTOGRAPHY.

Under this heading we apply to the various branches of colour photography the processes of collection and arrangement accorded to some fifty departments of ordinary photography in the "B. J." during 1916. These extracts are from issues of the "British Journal Almanac" of the years 1906 to 1915, and the present series of epitomes thus resuscitates and brings together in compact form much useful information, otherwise scattered through nearly a dozen volumes.—EDS. "Colour Photography" Supplement.

AUTOCHROMES BY FLASHLIGHT, ETC.

Autochrome Portraits by Flashlight.—F. Monpillard gives the following formulæ for a light-filter to be used when exposing the Autochrome plate by the "Ideal" flash powder of M. D'Osmond. The dyes employed are quinoline-yellow, extra Hoechst "patent-blue," and æsculine. The following stock solutions are first prepared:—

A.	Quinoline yellow	0.5 gm.
	Water, distilled	100 c.c.s.
B.	"Patent-blue," Hoechst	0.1 gm.
	Water, distilled	100 c.c.s.

In 5 to 6 c.c.s. of warm distilled water, contained in a graduated measure of 25 c.c.s. capacity, 0.05 gm. of æsculine is dissolved; 1.3 c.c.s. of solution A, 0.6 c.c. of solution B, and 12 to 13 c.c.s. of 10 per cent. gelatine solution containing glycerine in the proportion of 2 gms. per 100 gms. of gelatine are added, and the whole volume made up to 25 c.c.s. This warm solution is filtered and flowed on to glass in the proportion of 5 c.c.s. of the mixture per 100 square cm. surface. It is dried away from dust, and the film protected by cementing a second glass to the first with Canada balsam.

Each square cm. of this screen thus contains:—

Quinoline-yellow	0.000013 gm.
"Patent-blue," Hoechst	0.0000012 gm.
Æsculine	0.0001 gm.

The screen thus prepared is placed either before or behind the lens; in all cases it is best to focus with the screen in position, taking the usual precautions necessary when using the Autochrome plate.

With a lens of *f*/4.3 aperture and a full-length subject placed about 10 ft. from the camera, 8 to 10 gms. of the powder will suffice for an exposure. The powder should be laid in a train 15 to 20 ins. long, and placed behind a muslin screen, the latter being about 6 to 7 ft. from the sitter. A little diffused daylight in the room is an advantage, as the sitter does not then feel the shock of the brilliant flash.—"Bull. Soc. Fr. Phot.," May 15, 1909, p. 203; "B.J." (Colour Supplement), July 2, 1909, p. 51.

H. D'Osmond gives some practical hints on the use of the Autochrome by the "Ideal" flashlight, using the above filter. About 8 to 10 gms. of powder were used about 6 ft. from the subject, placing a diffusing screen of muslin about 18 ins. in front of the light. A lens working at *f*/3.8 was employed.

A vigorous developer being necessary, the following solution was made up:—

Metoquinone	15 gms.	130 grs.
Sodium sulphite, anhydrous	100 gms.	2 ozs.
Ammonia 22 deg. (0.923)	32 c.c.s.	4½ drs.
Potass. bromide	6 gms.	54 grs.
Water	1,000 c.c.s.	20 ozs.

and diluted for use with four parts of water.—"Photo-Gazette," June, 1909, p. 141; "B.J." (Colour Supplement), Aug. 6, 1909, p. 60.

Autochrome Flashlight Portraits.—B. J. Falk, New York, uses flashlight for studio portraits on the Autochrome plate. About 200 grains of powder are ignited in a narrow tray, 15 × 1 × 1 inches, about 8 to 15 ft. from the sitter. The flash is always used in one fixed position, under a draught-funnel, which clears the smoke through the roof of the studio quickly, without allowing any of it to spread about the room. Variation of lighting is obtained by re-arranging the positions of sitter and camera, and very pleasing results are being obtained. So far as can be judged without detailed comparison with the originals, the Autochromes appear truthful, with perhaps a tendency to emphasise the warm colours, which is all to the good with most complexions. The modelling is good, and the lighting of heads, busts, and half-lengths is very good and even. In some cases the relative smallness of the source of light shows itself by strong cast shadows (of the nose, for instance).—"B.J." Colour Supplement, March 3, 1911, p. 23.

Autochromes by Enclosed-Arc Light.—It has been found that the colour rendering of Autochromes, illuminated by enclosed arc when using the Lumière filter, is unsatisfactory. This is possibly due to the filter not absorbing all the ultra-violet rays in which these lamps are so rich. A filter that will give good results, however, can be made from a solution of bichromate of potash in water. This must be very dilute, from 1-15th to 1-20th of 1 per cent., according to the width of the filter cell, 1-20th per cent. serving for a cell one centimetre in width.—"B.J.," Jan. 29, 1909, p. 86.

Special Light-filters.—A von Hübl gives the following formulæ for compensating light-filters for use with arc and Nernst electric light and incandescent gaslight in making Autochrome exposures.

When working by arc light there should be less red dye in the filter. A suitable formula is:—

Gelatine solution, 1 : 15	40 c.c.s.
Tartrazine solution, 1 : 500	4 c.c.s.
Saffranine solution, 1 : 7,000	1 c.c.
Æsculin, dissolved in 35 c.c.s. water, with addition of 3 drops ammonia	0.4 gm.

8 c.c.s. of this solution are used for each square décimetre surface. This filter used in photographing a grey scale illuminated by a 25-ampère arc lamp gives a neutral reproduction. It must be remarked, however that the colour of the light is dependent to a considerable extent on the state of the carbons and on the size and mounting of the lamp; also on the voltage; and thus a filter which can be relied upon to give constant compensation when making Autochrome exposures by arc light cannot be made.

FILTER FOR USE WITH NERNST LIGHT.

When using the Nernst or incandescent gaslight a pale greenish-yellow filter is needed, and is best prepared by combining a yellow screen with one of pale blue. The screens being weak in colour, it is best to make a 1 : 2,500 solution of tartrazine by mixing 10 c.c.s. of the 1 : 500 solution with 40 c.c.s. of water. The filter for the Nernst light is:—

Yellow Screen:—

Gelatine solution, 1 : 15	40 c.c.s.
Tartrazine solution, 1 : 2,500	3 c.c.s.
Æsculin, dissolved in 37 c.c.s. of water, with addition of 3 drops ammonia	0.1 gm.

8 c.c.s. of this solution are used per square décimetre surface. This forms a yellow screen. A blue screen is made as follows:—

Blue Screen:—

Gelatine solution, 1 : 15	40 c.c.s.
Patent blue solution, 1 : 1,000 (Hoechst)	2 c.c.s.
Water	38 c.c.s.

7 c.c.s. of this solution are used for each square décimetre of glass. The two screens are bound together as described below.

FILTER FOR INCANDESCENT GASLIGHT.

The yellow screen is that given above for the Nernst light. The blue screen is a little paler; the above "patent blue" gelatine solution is used to the amount of 5 c.c.s. per square decimetre. These yellow and blue screens are cut to the size required when dry, are cemented with Canada balsam, and bound with lantern binding. It is also necessary in the case of the Nernst and incandescent light to bear in mind that the colour is liable to vary as the lamps are kept in use. Used lamps emit a decidedly reddish light, and require filters differing from those which are correct for filaments or mantles freshly taken into use.—"Phot. Rund.," Heft 1, p. 1; Heft 2, p. 17, 1909; "B.J." (Colour Supplement), Feb. 5, p. 14, and Mar. 5, p. 17, 1909.

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THE AUTOCHROME PLATE IN PHOTO-LITHOGRAPHY

[The great advantage which has been taken of the Autochrome process in three-colour photo-engraving is, we may suppose, familiar to most of our readers, who know the value of an Autochrome as a guide to the fine etcher of three-colour blocks and may further be acquainted with the use of an Autochrome as a subsidiary original, dispensing with the making of three separate colour-sensation negatives in the original photographing of a painting or other subject to be reproduced in three-colour half-tone. Photo-lithography, with its practice of printing in many colours, has, on the other hand, been regarded hitherto as a less promising field for the utilisation of a method such as that of the Autochrome. In regard to this point it is worth while to reprint the opinion of an American authority in photo-lithography (Mr. A. C. Austin), who, writing in the "National Lithographer," forecasts a wide use of Autochrome plates among lithographers.—Eds. "B.J."]

Among certain photo-engravers the Lumière Autochrome plate is a very welcome addition to the means for producing colour work; four-colour typographic printing plates made from the Autochrome have proved quite satisfactory. Many art subjects in the Metropolitan Museum as well as in other institutions throughout the country have been made in this manner that otherwise could not be made satisfactorily. Valuable paintings that cannot be removed must be photographed in the institution, and while oftentimes the director will permit the paintings to be taken from the wall and placed in the daylight, the making of a set of colour-separation negatives is quite a task—unknown light-factor; lack of dark-room facilities, etc. Furthermore, the finishing of plates made from separation negatives is most troublesome because the copy is not available for comparison as the work progresses.

But when a good Autochrome has been secured, the operator has an original from which to make separation negatives and the finisher has a copy in colours to follow. Autochromes are not difficult to make, and when carefully exposed and developed, the fidelity to the original is most gratifying.

It seems strange to me that the lithographer has not made more of this valuable process. I do not happen to know of a single instance wherein it has been used. Possibly this is due to a lack of knowledge or a lack of appreciation, and it does seem that a few pointers would be welcome.

It is not necessary to discuss the details of exposure and development of the Autochrome plate. The manufacturers supply full instructions and the photographic magazines from time to time give the experiences of many operators with valuable hints for overcoming little difficulties that occasionally crop up. It will only be necessary to tell how the photo-engraver works and point out what the lithographer should do.

When the photo-engraver has an Autochrome, which is a *transparency* or positive, in colour, he puts it in the camera and directs the light through it, using colour filters to separate it into the necessary primaries. He uses process dry-plates with the half-tone screen and gets negatives ready for the etcher. A good operator is careful to get the proper colour filters and is cautious in his exposures, for unless all exposures are correctly made the good qualities of the Autochrome will be lost. Such an operator also pays special attention to the lighting, knowing full well the danger of an intense, direct light from a powerful arc lamp. The colours in an Autochrome are more or less fugitive, and many a good plate has been ruined through careless lighting. [More probably from excessive heating.—Eds. "B.J."]

It is conceded, of course, that even with the best Autochrome, to begin with, and the most skilful separation of colours, there will be more or less correction necessary in the finishing of the plates, much of which is due to the half-tone direct screen negative, but it is quite certain that no more labour is required than would be necessary with separation negatives direct from the copy.

With the lithographer the procedure is entirely different, and I believe the following is unique. That it is wholly practical can be easily demonstrated, and, to one that knows, quite obvious.

First of all *two* Autochromes are required, one to be used as copy and one for the reproduction, but not both made in the same way.

The manufacturers' instructions say, develop the exposed Autochrome for a given number of minutes; rinse off the developer, apply the reversing solution and afterwards re-develop in daylight. The result is a positive in the colours of the original. No fixing in hyposulphite of soda is required and but very little washing. Bear in mind, please, that this is a positive, and, as such, represents the original in colour range and tonal values.

Just such a positive is required by the lithographer, which, as said before, is to be used as copy for the lithographic artist to follow, but *not* for the photographer to make negatives from.

A second Autochrome exposure is made and developed to the right density but *not* reversed. After development the plate is to be fixed in the hypo bath. The result will be a *negative*, not a positive, and the colours will be *complementary*. If the subject was a lady in a red dress, that was red in the positive Autochrome, this dress would be green in the negative Autochrome, and likewise every colour and tone would be in its complementary value—roughly speaking, the yellows, blue; the reds, green; the blues, orange. This complementary negative is placed in the camera just the same as the positive. The colours are separated into the primaries with proper selection filters in the same manner but without the half-tone screen. The result is positive, a continuous-tone rendering in black and white of the particular colour selection. If the job is to be made in six colours, make as many positives, using special filters to get just the values required for each colour. Of course, some skill and experience is necessary to determine the particular filters and varying densities, but as filters can be obtained in almost infinite variety it is only a matter of selection.

It is well, also, in making Autochromes to use a fairly large plate; while they are somewhat expensive, the cost is really immaterial. If the light-factor is obtained by means of a photometer before exposure there is little danger of error and loss. Furthermore, if the camera used first is rigged properly a very small trial plate, say 3¼ x 4 may be used as a test and is comparatively cheap. Little errors in exposure can also be easily corrected.

It is well to prepare a number of cover glasses by fixing an ordinary dry plate, just out of the box, thoroughly fixing, washing carefully and staining in various ways to get a very light blue or pink, and when needed, to bind one or the other to the Autochrome. A slight tendency of the original to one shade or the other can be corrected with this tinted binder. It is also advisable to use a piece of mud ground glass in connection with the Autochrome to diffuse the light and assure evenness of illumination.

It is wonderful how much can be accomplished by a judicious use of tinted cover glasses. One may even go much farther than just blue and pink. Sometimes yellow is helpful, and this or the other colours are made with the cheap packet dyes sold for dyeing purposes in nearly all drug and departmental stores. It is only to be remembered that correction is always with a colour that is complementary to the error. That is to say, that if an Autochrome is slightly under-exposed it will have a bluish cast in the whites which can be corrected with a yellowish pink cover glass. Understand that "bluish" and "yellowish pink" are relative terms. Judgment as to needs is determined visually. After suitable continuous-tone positives have been obtained the lithographic artist proceeds with brush, pencil and stomp to build up the various colours wanted in the same manner that he would do if working on stone. Everything is done that can be done, and only the skill or lack of skill on the part of the lithographer determines the final result.

The whole process is worthy the earnest attention of all lithographers. And although Autochrome plates are made in France, and the U-boat has been a menace to shipping, we are yet able to get all the plates we need—at least all that are required at present.

"When this cruel war is over" I predict a big demand for Autochrome plates, or plates of a similar character, by the lithographic trade, and it would be well for the wide-awake man to get on the job now.

A. C. AUSTIN.

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AUTOCHROMES BY FLASHLIGHT, ETC.

Photomicrography by Limelight on the Autochrome Plate.—M. Monpillard gives the following formula for a compensating filter to be used when using limelight as the illuminant in photo-micro work on the Autochrome plate:—

STOCK SOLUTIONS.

A.	Quinoline yellow	0.5 gm.	44 grs.
	Water, distilled	100 c.c.s.	20 ozs.
B.	Brilliant acid green 6 B	0.1 gm.	1 gr.
	Water, distilled	1,000 c.c.s.	20 ozs.

In 5 to 6 c.c.s. of distilled water placed in a 25 c.c. bottle there is first dissolved 0.05 gm. of æsculine, 0.5 c.c. of solution A is then added, 1 c.c. of solution B, and then 12 to 13 c.c.s. of 10 per cent. gelatine solution in glycerine. The volume is made up to 25 c.c.s. with distilled water, filtered hot, and flowed upon the glasses in the proportion 5 c.c.s. of the mixture per 100 sq. cm.—"Bull. Soc. Fr. Phot.," June 15, 1909, p. 245; "B.J." (Colour Supplement), Aug. 6, 1909, p. 61.

Light-Filters for Autochrome Flashlight Exposures.—F. Novak has carried out a series of experiments, on the suggestion of Dr. J. M. Eder, in the preparation of a light-filter which would be suitable for use with the very actinic magnesium flash-powder, which is prepared by mixing one part of anhydrous thorium nitrate with two parts of magnesium powder.

Novak started from a formula for daylight exposures given to him by Dr. E. König, of Hoechst. This yields excellent results, and does not seem so far to have been published. It is as follows:—

To 100 c.c.s. 6 per cent. gelatine solution add:—

Rapid filter Yellow K. 1:200	12 c.c.s.
Kristall ponceau, 1:800	4 c.c.s.
Water	4 c.c.s.

This dyed gelatine solution is filtered and used in the proportion of 7 c.c.s. per 100 sq. cm. of surface. Two flat glass plates coated in this manner are cemented together to form the light-filter. A suitable cement is Canada balsam dissolved in chloroform.

This light-filter, as just mentioned, though excellent for daylight work, is not the best for flashlight exposures. The following modification made by Novak has given excellent results in flashlight work:—

To 100 c.c.s. 6 per cent. gelatine solution add:—

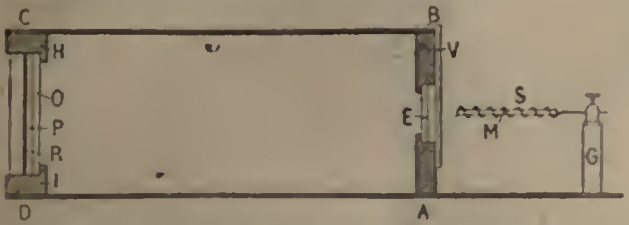
Rapid filter yellow, 1:200	15 c.c.s.
Kristall ponceau, 1:800	4 c.c.s.
Water	4 c.c.s.

The dyed solution is filtered as before, coated on glass again in the same proportion, and cemented to a plain cover glass with Canada balsam.—Eder's "Jahrbuch," 1911, p. 190; "B.J.," Colour Supplement, Dec. 1, 1911, p. 68.

COPIES, PRINTS, NEGATIVES, ETC., FROM AUTOCHROMES.

Copies of Autochromes by Magnesium Light. A. Seyewetz has described the apparatus devised by MM. Lumière and himself for securing a constant and readily-obtainable light by which to print from an Autochrome on to an Autochrome plate without a camera. A rectangular wooden box A B C D, 40 cm. long, light-proof, and blackened inside to avoid reflections, has in its back C D an opening in which is fitted a special screen E, to give an exact orthochromatic effect with the magnesium light. This aperture can be opened and closed at will with the aid of a shutter V, which slides in a groove.

In the back of the box is put a closed frame H I, in which is placed first the Autochrome O, to be reproduced glass side in front—i.e., the surface C D—and also the sensitive Autochrome plate P facing glass side in contact with the Autochrome, and then the usual black cardboard. The frame is closed with the aid of the shutter R.*



A movable support G carries a spiral of iron wire S, placed horizontally, in which the magnesium ribbon M is placed during the burning. The iron wire spiral is meant to give the necessary rigidity to the ribbon. The support is placed at a certain distance from the front of the box, and in such a way that the magnesium ribbon is on a level with the centre of the screen.

The iron wire spiral must have a diameter of 0.3 to 0.5 mm., and be fitted in such a manner that there is one turn of the spiral per centimetre of magnesium ribbon.

Magnesium ribbon is measured to a length of from 10 to 20 cm. for a ribbon of 2½ mm. breadth, as required by the density of the Autochrome to be reproduced. It is folded in the middle in order to obtain half the length, and it is placed inside the spiral of iron wire, the *surface of the ribbon being in a vertical position.*

If, for instance, a magnesium ribbon is taken of 16 cm. length, this, folded in two, will be 8 cm., and will have to correspond with eight revolutions of the spiral.

It is necessary to observe this rule so that the conditions of combustion of the magnesium are invariable, greater or less rapidity of burning being likely to spoil the results.

The spiral support is so placed that the end of the magnesium ribbon is at a distance of 5 cm. from the screen and exactly in the centre of the box. With the shutter V closed, the magnesium is ignited and the shutter immediately raised. The combustion finished, the plate is treated as usual.

The exposure—that is to say, the length of the ribbon to be used—can easily be determined by a previous trial. It must be as exact as possible to obtain a good reproduction.

Of course, the operation has to be done with all other light excluded except the magnesium.

Care should be taken not to substitute copper or brass wire for the iron wire. Also the diameter of 0.3 to 0.5 mm. must be kept to as closely as possible, as this is suitable for a magnesium ribbon of 2½ mm. breadth. The spiral is simply obtained by winding an iron wire around a cylindrical rod of 3 or 4 mm. diameter, so that the turns of the spiral are equal; the rod is withdrawn and the spiral slightly stretched. When the magnesium ribbon has been placed inside it, it is stretched again until it has the required dimensions, that is to say, until the ends of the spiral are successively separated by a distance of 1 cm.—"B.J.," Colour Supplement, Jan. 7, 1910, p. 1.

Carl Kempe gives the following formula for a compensating light-filter for use when making copies of Autochromes on sensitive Autochrome plates using magnesium ribbon:—

SOLUTION No. 1.

Gelatine (7 : 100)	40 c.c.s.
Tartrazine (1 : 500)	4 c.c.s.
Pheno-saffranine (1 : 7,000)	4 c.c.s.
Aesculine (0.4 gm. in 35 c.c.s. water plus 3 drops ammonia)	35 c.c.s.

SOLUTION No. 2.

Gelatine (6 : 100)	100 c.c.s.
Rapid filter yellow K (1 : 200)	2.5 c.c.s.
Water	17.5 c.c.s.

Solution No. 1 was flowed on glass in the proportion of 8 c.c.s. per 100 sq. cm.; solution No. 2 in the proportion of 7 c.c.s. for the same area. The two filters were dried and bound film to film for use. In using this filter it should be noted that MM. Lumière direct the use of 16 cm. of magnesium ribbon held in a spiral of 1 cm. width for an average transparency. In using the above filter under otherwise identical conditions 3 cm. of ribbon was used. It is therefore better to use the ribbon in a spiral ½ cm. in width in order to prevent the magnesium band falling out.—"Phot. Rund," Heft 11, 1910, p. 125; "B.J.," Colour Supplement, Sept. 2, 1910, p. 67.

Three-Colour Carbon Prints from Autochromes.—Achille Carrara gives the following working details of the process found by him to yield three-colour reproductions of Autochromes on paper which are equal in brilliancy and colour rendering to the originals.

The first thing to obtain is a satisfactory set of three-colour negatives from the original Autochrome. These are made by contact in the following manner:—The source of light is one filament of a Radax Nernst lamp. The Autochrome is placed in an ordinary Lumière Autochrome reproducing box, in contact with a Wratten Panchromatic plate. To the front of the Lumière reproduction box (after removal of its shutter and yellow filter) is fixed a Thornton-Pickard studio shutter, which enables one to give accurate time exposures as necessary. In front of this shutter is placed a set of 1⅝-in. square sharp-cut analysis filters, for Nernst light. Between the filters and the light-source is interposed a sheet of fine ground glass (a fixed-out matt-emulsion gelatine plate, a Paget matt transparency plate will do). The distance of lamp filament from face of analysis filters is about 5 ins.

An exposure is then made through the red filter. An ordinary density Autochrome gives a good negative with 30 seconds exposure. The green and blue filters require each three times the exposure for the red filter, viz., 90 seconds.

The negatives are developed all three together in the same dish, if possible, with a Rodinal 1 in 22 for five minutes, which gives a soft, delicate negative. In some cases a negative with a little more vigour in it is better, especially for carbon printing, and this is easily obtained by slightly increasing the time of development with the addition of a few drops of 10 per cent. bromide solution to the developer if necessary.

The negatives are all very good and clear. In the yellow-printing negative (blue filter) the granular structure of the Autochrome plate is very marked, but it has no importance whatever in the printing process, as this granular structure will be absolutely invisible.

In the red-printing negative (green filter) the Autochrome granular structure is much less marked and the red prints are very smooth and clear.

The blue-printing negative (red filter) is the one to give us trouble, as the granular structure comes out very marked, and in superimposing the blue print on the yellow and red prints the granular structure of the blue print is much too evident.

A softening of the general granular structure on all three plates was necessary to begin with, and this was easily obtained without the loss of any detail in the negatives by interposing a border mask of notepaper between the Autochrome film and the panchromatic plate before making the exposures. This had the desired effect of greatly softening the granular structure on the resulting negatives.

As a further aid to reduction of grain it is well to interpose a thin sheet of celluloid between the blue sensation-negative and the blue tissue when printing, and this has the desired effect of practically nullifying most of its obtrusive granular structure.

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* This box can be substituted by an ordinary camera (from which the lens has been taken away) having a sufficient opening provided with a holder deep enough to carry two superimposed plates.

For printing the three negatives use the Autotype three-colour tissues. Sensitising is done with a quick-drying sensitiser (see under "Carbon Printing").

It will be found that the average strength of the bath will be 4 per cent. for the red tissue and 3 per cent. for the blue and yellow tissues for printing portraits in the sun, as the red tissue is required to cover more of the high-lights in the flesh tints than the yellow or blue. However, the question of strength of sensitising baths is one to be adjusted for each set of negatives.

It is best to print in the sun, and to use a Watkins exposure meter and stop-watch for timing exposures. Once these are fixed for a set of negatives, prints from it can be made at any time without difficulty.

In the case of a portrait with dark background of green foliage the printing data are:—

Blue tissue 3 per cent. spirit bath: printing ratio, 8½ times Watkins' standard meter tints.

Red tissue 4 per cent. spirit bath: printing ratio, 6 times Watkins' standard meter tints.

Yellow tissue 3 per cent. spirit bath: printing ratio, 5 times Watkins' standard meter tints.

Considering that the average time for the darkening of Watkins' Steadfast paper in sunlight is about 5 seconds, these exposures for the tissue work out to:—

Blue	6 × 8½	= 51 seconds.
Red	6 × 6	= 36 ,,
Yellow	6 × 5	= 30 ,,

And therefore 1 minute's good sunlight is sufficient to print a set of negatives.

As temporary support, celluloid waxed with Vanguard's "Glissolene" is excellent in all respects. As cementing medium between the three films a 5 per cent. solution of hard gelatine in water is used, and applied as cold as possible to the paper print laid flat on a piece of glass or opal, gently lowering on to its gelatine-solution-covered surface the next film to be superimposed on its celluloid temporary support.

A few drops of carbolic acid will allow the gelatine solution to be kept in use for some time and used repeatedly.

Benzole cleans the wax off the surface of the prints after stripping the celluloid, and a ten minutes' immersion of the finished print in a 10 per cent. solution of alum serves to harden and render insoluble the cementing gelatine.—"B.J." (Colour Supplement), March 6, 1914, p. 10.

A PIONEER IN COLOUR PHOTOGRAPHY.

The interesting references, writes a correspondent, to the older photographic text books and to other literature of the past, made in the "B.J." a few weeks ago, recalls to me a name which has become largely lost sight of by writers on colour photography, although it is one which, in certain respects, deserves to be ranked with Du Hauron's. I refer to Henry Collen, at one time miniature painter to Queen Victoria, who in the year 1865 suggested a general process for making photographic prints in natural colours. He wrote in terms of Brewster's theory of colour, but, none the less, it may be worth while to signalise what he had to say for the information of the present generation. If I am not mistaken, his paper —it was a very short one—appeared in The British Journal.

Collen's suggested process was communicated in a letter, which appeared in the "B.J." of October 27, 1865, and ran as follows.—Eds. "B.J.":—

Photography in Natural Colours.

In a recent conversation the above subject was mentioned, but, although often thought of heretofore, all I could then say on it was that to obtain the natural colours of objects superadded to the practice of photography as it now stands is by far less an apparent impossibility than the present practice of photography would have been in 1765, if it could even have been dreamed of; that, therefore, it was not to be considered a hopeless case. It occurred to me, however, this morning that if substances were discovered sensitive only to the primary colours—that is, one substance to each colour—it would be possible to obtain photographs with the tints, as in Nature, by some such means as the following:—

Obtain a negative sensitive to the blue rays only; obtain a second negative sensitive to the red rays only; and a third sensitive to the yellow rays only. There will thus have been three plates obtained for printing in colours, each plate having extracted all its own peculiar colour from every part of the subject in which it has been combined with the other two colours, and being in a certain degree analogous to the tones used in chromo-lithography. Now, it is evident that if a surface be prepared for a positive picture, sensitive to yellow rays only, and that the two negatives sensitive only to blue and red be superimposed either on the other, and be laid on this surface, the action of light will be to give all the yellow existing in the subject; and if this process be repeated on other surfaces sensitive only to red or blue respectively, there will have been produced three pictures of a coloured object, each of which contains a primitive colour reflected from that object.

Now, supposing the first great point achieved—viz., the discovery of substances or preparations each having sensitiveness to each of the primary colours only—it will not be difficult to imagine that the negatives being received on the surface of a material quite transparent and extremely thin, and that being so, are used as above—*i.e.*, each pair of super-imposed negatives to obtain the colour of the third—that three positives will be obtained, each representing a considerable portion of the form of the object, but only one primary of the decomposed colour of it. Now, if these three positives be received on the same kind of material as that used for the negatives, and be then laid the one on the other, with true coincidence as to the form, and all laid upon a white surface, it will not be difficult to imagine that the effect would be not only the representation of the form of the object, but that of its colour also, in all its compounds.

Very perfect contrivances would be required to produce true superposition of both negatives and positives, and a considerable difficulty would exist in handling the extremely thin material. This, however, as well as all other difficulties, will easily be overcome when the chemist has discovered the three preparations which are each of them sensitive to one of the primary colours only.

Although the idea I have endeavoured to express in words may be utterly worthless, I am unwilling to let it slip away without notice, as it may, on the other hand, contain a germ which may grow and bear fruit in due season. It is a subject which must have been common to the thought of all intelligent photographers, and there can be no doubt that attempts have been made to solve the problem with certain glimpses of success. The processes, I believe, have never become public, but if all attempts and thoughts on the subject were made known to all, the desired end of the vista would certainly come into view at an earlier period than it would otherwise do.

St. Albans, Oct. 17, 1865. Henry Collen.

THE DOUGLASS PROCESS OF CINEMATOGRAPHY.

In the United States, as we have several times pointed out of late, a great degree of interest is evinced in the development of methods of taking and projecting motion pictures in colour. We have referred in past issues of this "Supplement" to the Prizma process and Technicolor processes, and we now owe to the same technical journalist, Mr. Alfred S. Cory, by whom advance information was sent us of these methods, some particulars just to hand of the experimental work of Mr. Leon F. Douglass, of San Raphael, Cal., a demonstration of whose results has recently been given in New York. Mr. Cory, as shown by the advance proof of a lengthy article for the "Motion Picture World" which he has sent us, evidently looks forward to what Mr. Douglass may achieve in the near future. It can scarcely be said that the process at present outlined constitutes any technical advance upon methods which are well known. The Douglass process is closely upon the lines of Kinemacolor—that is to say, it is a two-colour process, in which the colour combination upon the projection screen is obtained by superimposition of successive impressions in the observer's eyes. On the other hand, it differs from Kinemacolor in providing light-filters upon the film itself instead of in the form of a rotating segmental light-filter upon the projection lens. This, again, is a form of process which was demonstrated in London some three or four years ago. Nevertheless, it is interesting to learn that Mr. Douglass, like many other inventors in this country, is turning his attention to a subtractive type of process designed to yield colour films which can be projected at the standard black-and-white rate of sixteen per second, and will not call for special requirements in the way of the projecting apparatus.

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SOME THOUGHTS ON COLOURED PHOTOGRAPHS AND PHOTOGRAPHS IN COLOUR.

An interesting and suggestive feature of the exhibition of war photographs at the Grafton Galleries is the general satisfaction expressed with the colour effects produced. Many have commented on the realism introduced by the colour, and probably not a few have thought, "If coloured photographs can look as well as these why should we trouble ourselves with elaborate methods of colour photography?" We have been informed that some guileless individuals expected to see an exhibition of what they called "real" colour photographs, but, from past experience of such exhibitions on a much smaller scale, it seems to us that if these had been colour photographs of the "real" variety very few visitors would have been as satisfied with the results as they are now with the "coloured" photographs shown, which seem to have come as a revelation to many. The fact seems to be that the art of colouring photographs is only just beginning to get a fair chance. The air-brush as a mechanical aid has perhaps helped it, but, more than that, it seems that the right people have not long begun to work at the method. Not long ago almost anyone who could make a photograph seemed to think he could colour it, and semi-mechanical processes, such as crystoleum, helped to foster this delusion. We had sometimes to put up with the crudely tinted lantern slide daubed over with aniline colours; sometimes with bromides coloured, apparently, on the model of oleographs; while more ambitious or "artistic" temperaments endeavoured to colour prints on what they considered to be Japanese principles. A very few people, who really know something about colour, succeeded in getting fairly good results, but their work was swamped by the crowd of others who thought that colouring on a photographic basis was a simple operation, requiring no special experience of colour or colour manipulation. To anyone who has studied colour, and who more especially has tried to paint in colour, it is a very obvious fact that a true appreciation of natural colour is possessed only by the few. It is a curious but indisputable fact that a large number of people who can see, understand, and imitate artificial colour perfectly, are hopelessly at sea with natural colour. Many students who can copy a painting almost exactly will yet fail absolutely to paint a single tint correctly direct from nature, and many quite excellent copyists are really no good at all at painting from nature. Some teachers attribute this to the practice of copying, which they therefore discourage or forbid as well as they can; but, while copying is undoubtedly very bad training for the student, it seems certain that temperament has a great deal more to do with the inability to understand the colouring of nature; and many useful copyists, if they had never been allowed to copy, would never have been able to use colour at all.

In the ancient days when colour photography of the "real" variety was an absorbing topic in the photographic world, and when numerous individuals were putting forward their own modified applications of the three-colour process, it was only too painfully evident how many failed altogether to show any appreciation of colour as it is in nature. The people who succeeded in reproducing "natural colour" were very few indeed, and hardly any of those who failed seemed able to appreciate the fact that they had failed. Numberless examples of photographs in natural colours were really hopelessly unnatural, and the fact was so evident that it probably did more than anything else to cool off general enthusiasm for colour work. A very great obstacle to the progress of colour photography is the fact that the individual who does understand colour, and can appreciate it, can nearly always paint, and therefore has the less need for colour photography. That craft, in fact, is wanted chiefly by those who cannot paint from nature, and who are, therefore, mostly very bad judges of colour. There are exceptions, of course, but there are not many. On the other hand, the man who can colour, though he has no use for colour photography, may very well be persuaded to colour a photograph, and it seems that the best possible results in the way of colour work are likely to be the combined efforts of the photographer and the skilled colourist, while possibly it may be found that the humble copyist may do excellent work in the production of replicas.

As regards the function of the real colour photograph it is difficult to say anything in view of the fact that a really successful paper process can hardly be said to exist. There are two or three processes which in theory seem promising but in practice seem to succeed only in the hands of a few experts, who tell us little about their failures. A really good simple process that could be worked with mechanical certainty would be sure to find uses, but I feel sure that the production of pictures, or even of pictorial records, will not be one of them; one reason being that the right men will never use it. The representation of still life objects or commercial articles is, however, a simpler matter, somewhat on a par with copying, and within the capabilities of less skilled workers, and here there should be a good opening for colour photography. Even here I am not sure that three-colour half-tone work does not fit the requirements about as well as can be desired, while I certainly feel doubtful if any other process is likely to be invented that will have any advantages over first-class process work as experts carry it out to-day. C. WELBORNE PIPER.

DECENNIA PRACTICA—COLOUR PHOTOGRAPHY.

Under this heading we apply to the various branches of colour photography the processes of collection and arrangement accorded to some fifty departments of ordinary photography in the "B. J." during 1916. These extracts are from issues of the "British Journal Almanac" of the years 1906 to 1915, and the present series of epitomes thus resuscitates and brings together in compact form much useful information, otherwise scattered through nearly a dozen volumes.—EDS. "Colour Photography" Supplement.

Copying Autochromes.—M. E. Cousin points out the advantage, when preparing duplicates of Autochromes, of making (in the first instance) an Autochrome negative, that is, in complementary colours. In this case, of course, the customary reversing process and second development are omitted, the plate being simply developed, fixed, and, if necessary, intensified. In thus working from a negative Autochrome, if the colour screen is not exactly balanced as regards the light, the predominant tint which is produced exists in the complementary colour, and in the reproduction process serves as a correcting screen. In short, the predominant tints of the negative and the positive colour transparencies compensate for and tend to extinguish each other. It is obvious that in making the copy it is necessary to use a light of the same character as that with which the original negative was taken.

On the other hand, when working from a positive Autochrome, any predominant tint, due to incomplete adjustment of the light-filter, is added to in the reproduction, and may thus be accentuated to a degree which is very noticeable.—"Bull. Soc. Fr. Phot.," Nov., 1913, p. 330; "B.J." Colour Supplement, Feb. 6, 1914, p. 7.

Pinatype Prints from Autochromes.—L. Didier has given details of the application of the pinatype process to the reproduction of autochrome pictures. The autochrome is best prepared as a negative (unreversed). From it are separately made three positive transparencies representing the three-colour-sensations in the negative. A filter of green, red, or blue-violet is used in thus printing from the autochrome, the operation being done in the camera, or, quite practically, in the printing frame. The transparencies are themselves used as the pinatype print-plates, and it is found that the scattering of light from the grains of the image is sufficient to prevent the degradation of the print. The positive transparencies (print-plates) should be fairly strong in contrast, but with good gradation and perfectly clear whites.—"Phot. des Couleurs," March, 1908, p. 65; "B.J." (Colour Supplement), May 1, 1908, p. 35.

Prints from Autochromes by Means of the Leuco Bases.—E. Stenger and F. Leiber, in discussing the possibility of preparing a print-out paper which at one exposure underneath a screen-plate colour negative should give a positive in colours, incline to the view that the leuco compounds of dyes will permit of this result being obtained. The colours formed from the leuco bases are brilliant and transparent. For reproduction of screen-plate negatives the paper would have to be coated with leuco bases which give the colours bluish-red, yellow, and blue-green. The authors are unable to decide whether the leuco bases can be mixed before applying to the paper, or whether, for example, starch grains may be impregnated separately with the bases and a mixture applied to the paper. Inequalities in the sensitiveness of the bases can no doubt be overcome by covering the printing frame during half of the time of printing with a colour filter faintly stained with a dye complementary to the colour.—"B.J." (Colour Supplement), May 1, 1908, p. 34.

Enlarged Negatives from Autochromes.—It sometimes happens that one has an Autochrome of exceptional beauty, from which it is desired to make a larger print in monochrome, and for this purpose the Autochrome can be used as the intermediate positive from which an enlarged negative is made. If the enlarged negative is made on an ordinary plate the granular effect of the Autochrome will be very apparent, and to get a smooth negative with this granular effect eliminated one should use an orthochromatic plate with a three times, or preferably five times, screen. This will give an enlarged negative of a fine quality, equivalent to an original negative made with a colour screen, as all the colours of the Autochrome will be represented in the enlargement in their proportional values of black and white.—"B.J." (Colour Supplement), November 7, 1913, p. 44, from "Journal of the Photographic Society of Philadelphia."

Autochromes from a Set of Three-Colour Negatives.—Dr. E. Stenger has given directions for the making of a single Autochrome from a set of the three-colour-sensation negatives. He provides the negatives with register frames and the Autochrome plate with a similar frame, exposure being given through the filter-film of the Autochrome plate in three separate times, which must be adjusted according to the ratios of the three-colour filters, which are placed between the light-source and the printing frame. The exposures also vary according to the light-source employed.—"Atelier," February, 1908, p. 18; "B.J." (Colour Supplement), April 3, 1908, p. 30.

PROCESSES OF MAKING COLOUR SCREEN-PLATES.

[In regard to these extracts from the "Almanacs" of the years 1906 to 1915, processes relating to the Autochrome and Paget screen-plate colour processes will not be found among them, since they appeared in a previous instalment, namely, that in the "Colour Supplement" of August 3, 1917. The processes here dealt with are arranged in alphabetical order of the patentees' names in those cases where several patents stand in the name of a single experimenter. Single patents will be grouped in a class by themselves at the end of this alphabetical series.]

BAMBER'S PATENTS.

Gelatine Grain Process.—J. Bamber has patented a method (for application to celluloid) of forming the three-colour mosaic filter by means of a mixture of coloured grains of transparent gelatine, which are applied to the sheet of celluloid, allowed to expand by standing in moist air, or by application of a gelatine solution, then dried and rolled into contact with the celluloid, and finally varnished. The process is similar in principle to the Lumière starch grain. The coloured gelatine particles are said to be made by first dyeing the gelatine, soaking in 15 per cent. formaldehyde, again drying, immersing in water in order to produce maximum expansion, and then (the gelatine being now in a brittle state) reducing to a fine granular condition in a grinding mill at a temperature of about 200°F. The gelatine powder is then separated into grains of various grades of fineness by a process of elutriation, using petroleum spirit of 0.700 sp. gr. or other liquid not absorbed by gelatine. In this way batches of grains up to a fineness of 1-3000-in. in diameter are stated to be obtainable.—Eng Pat. No. 3,252, 1908; "B.J.," Oct. 16, 1908, p. 796.

Gum-Resin Grain Screen-Plates.—A further patent of J. Bamber's relates to a process for manufacturing a mosaic colour screen by forming the colour grains of a gum resin, compounded with a fixed unoxidizable oil, applying the colour grains to a tacky substratum containing a gum resin, an essential oil, and a fixed unoxidizable oil, then bringing the surface of the screen thus formed into contact with a solvent vapour, which liquefies the grains, and causes the colour elements to flow freely and completely fill up the interspaces between them. The plates are first given a substratum of :—

Gum sandarac	½ oz.
Castor oil	½ oz.
Oil of lavender	1 oz.
Alcohol	2 ozs.

To produce the colour grains a mixture is prepared such as :—

Gum sandarac	4 ozs.
Castor oil	1½ ozs.
Alcohol	12 ozs.

When the gum is dissolved the filtered solution is divided into three equal portions, each portion is then dyed by aniline dyes in one of the three primary colours of the spectrum. After evaporation of the alcohol from the three coloured portions (preferably by gentle heat), the resulting mass of each colour is then broken up and reduced to powder separately. The powders are then separated into the desired size of grains by sifting or other known means.

The colour grains thus obtained are now thoroughly mixed in the proper proportions to produce a neutral tint when viewed by transmitted light after the grains have been applied and the screen is finished.

To form the screen an ordinary printer's "composition" roller may be evenly charged with the substratum varnish and then rolled over the glass or film, thus leaving a very thin and even film of substratum.

The colour grains are now sifted or brushed over the tacky substratum in one even layer. The alcohol at once evaporates, the essential oil, and some of the fixed oil, still contained in the substratum is soon absorbed by the overlying colour grains, thus softening them. If the surface of the screen be now placed in the influence of a solvent vapour, which may be the vapour of alcohol, acetone, wood naphtha, etc., the softening of the colour grains is further continued until they have become sufficiently fluid, when the capillary attraction existing between the grains will draw some of the non-fluid colours into the spaces between them, however irregular or small they may be, thus cementing the grains together and leaving the surface level, gapless, bright, and transparent, requiring no varnish.

The large addition of castor oil to the composition of the colour grains is to facilitate the flow of the colours when under the influence of the substratum and the solvent vapour.—Eng. Pat., No. 15,775, 1911; "B.J.," Aug. 30, 1912, p. 677.

Screen-Plate with Compensating Filter.—A patent of J. Bamber's specifies the use of a coloured substratum, serving as a compensating filter when making screen-plate exposures. The three colours are applied to this coloured basis by dusting-on or other method. Eng. Pat. No. 11,147, 1909; "B.J.," Sept. 17, 1909, p. 730.

BRASSEUR'S PATENTS.

Bichromate printed Line Screen-Plates.—C. L. A. Brasseur has patented methods of making line-colour screens so as to (1) avoid staining of one image by another; (2) produce screens of finer ruling; (3) produce a screen firmly built together with absence of air-bubbles, blisters, etc.; and (4) make the screen so that the outer surfaces of the coloured portions are in the same plane or at one level.

The glass is coated with a substratum, such as water-glass, and a layer of coloured gelatine applied either in the coloured state or uncoloured for subsequent dyeing. The coloured gelatine film prepared in either way is sensitised in a bichromate bath, printed, and developed. For the second and third monochromes it is most important that the colour be inserted into the film before development; but for the first it will answer as well whether put in before sensitising and printing or before or after development.

It is preferable, however, to colour the gelatine from the start, and to print from the negative or line-screen. In the latter case, the engraved or ruled side of a half-tone screen, having a patterned area containing white or transparent spaces one-half as wide as the opaque spaces, is laid against the sensitised side of the film, and the printing done through the white areas. In either case the image lies in an area or areas of the coloured gelatine film determined by the nature of the stopping-out medium, whether a photographic negative or a line-screen.—Eng. Pat. No. 21,210, 1904 ("B.J.," Nov. 3, 1905, p. 873, where lengthy extracts from the patent are given.)

Screen-plate and Emulsion.—C. L. A. Brasseur has patented certain forms of ruled colour screen-plates of a kind to indicate variations in the colour-sensitiveness of the plate in connection with which they are used. This is done by providing short extensions of single-colour bands.—Eng. Pat. No. 12,793, 1906; "B.J.," Aug. 24, 1906, p. 674.

C. L. A. Brasseur has patented an improvement on the processes described in specifications Nos. 8,390, 1896 ("Colour Photography" Supplement, March 1, 1907, p. 24), and 15,185, 1906 ("B.J.," Aug. 21, 1906, 674), permitting of the production of full-tone images from a negative taken through the Sampolo-Brasseur line colour filter. The process consists in fixing the negative made through the three-colour ruled screen in a printing frame, and placing upon it the black-and-white screen of glass or mica, as previously used, in such a way that one only of the three images is left uncovered. The printing frame is then turned on its axis, first in one direction and then in another, in order to secure the printing of all three images. —Eng. Pat. No. 716, 1907; "B.J.," Sept. 6, 1907, p. 678.

Special and Accessory Filters.—Further patents taken out by C. L. A. Brasseur are :— (1) For polychrome glass screens for use when copying from one screen-plate to another (Eng. Pat. No. 4,932, 1907; "B.J.," March 27, 1908, p. 243), and (2) for adjustable compensating filters of sector form for use on the lens (Eng. Pat. No. 4,745, 1908; "B.J.," July 3, 1908, p. 515).

Mosaic Grain Screen Plates.—A further patent of C. L. A. Brasseur is for a process of making a grain filter screen, the colour elements in which are flat on both sides, are thin, and touch each other :—Particulars of dyed celluloid or other plastic, transparent materials are cut from a sheet into pieces about 1-500th to 1-1,000th of an inch square, and are rolled between discs to render them roughly spherical, when they are sifted (to grade them as to size) and again rolled. They are applied to a celluloid support by a transfer method—that is, they are first applied to paper coated with an adhesive which loses its stickiness when completely dry (*e.g.*, gum). When the paper has been covered with the mixture of tiny spherical particles, it is rendered adhesive by moisture, the grains thereby fixed, and the excess brushed off. This coating is then applied to the celluloid sheet, and the two brought into contact under heat and pressure, when the particles adhere together, flatten out, and are fixed to the film support. In this way, it is claimed, the particles do not run together and become irregular in shape, as is the case when applied direct by pressure and heat to the celluloid. Means are described for filling up any interstices left in the coating of coloured particles. Eng. Pat. No. 18,750, 1908; "B.J.," Feb. 19, 1909, p. 145.

CHRISTENSEN'S PATENTS.

Shellac Grain Screen Plate.—J. H. Christensen proposes to manufacture a mosaic colour screen-plate composed of particles of shellac suitably dyed. He prepares the dyed solutions of shellac in spirit, and then forms an emulsion of the shellac in turpentine, either by the simple addition of the shellac solution to turpentine or with an emulsifying machine. The shellac particles are obtained of larger or smaller size by allowing different times for subsidence, and the emulsions thus prepared are applied either separately or in admixture to a plate coated with a thin layer of shellac, to which the shellac particles in the emulsion attach themselves and are caused to adhere by heat or pressure.—Eng. Pat. No. 20,971, 1908; "B.J.," Apr. 2, 1909, p. 269.

A further patent taken out by J. H. Christensen, additional to No. 20,971 of 1908, describes a further improvement in the manufacture of a shellac grain screen, viz., by precipitating particles of shellac from solution so as to obtain them in a medium in which they are completely or practically insoluble.—Eng. Pat. No. 21,007, 1908; "B.J.," Nov. 12, 1909, p. 878.

According to a further patent, an improvement consists in the use of one or more acids for treatment of the emulsified particles, the acids being soluble in the particles.—Eng. Pat. No. 7,480, 1912; "B.J.," Mar. 28, 1913, p. 255.

DUFAY'S PATENTS.

Dufay Screen-Plate.—According to an English patent applied for by M. L. Dufay, a process of making a polychrome screen-plate has been based upon the following operations :—A print is made on a bichromated gelatine plate from a negative or grating of opaque and transparent bands. This print, after development, is dyed in a bath of suitable colouring matter, and is then inked up with greasy ink, after the manner of ordinary collotype printing. There is thus obtained in the exposed parts of the bichromated print a greasy impression, and in the non-exposed parts a, say, red colouring matter. This plate is then applied by pressure to a surface coated with plain gelatine. As a result of this contact the greasy ink transfers itself to the gelatine surface, whilst the dye in the interspaces penetrates into the substance of the gelatine itself. We have thus a series of lines (supposing this form of sub-division of the surface to have been adopted) covering, say, one-third the area of the plate with the red filter, whilst the remaining two-thirds is covered with opaque lines of greasy ink. Before these latter have completely dried, a varnish, incapable of affecting the ink, is applied, and when the whole plate is dry, turpentine or similar solvent of the ink is applied, so that both ink and varnish are removed and the plate left with one-third of its area covered by the red filter elements protected by a varnish coating.

A second bichromate printing followed by the above series of operations gives, say, the blue portions of the screen, and lastly the whole screen is placed in a green dye bath, in which the unprotected parts are dyed of this latter colour.—Eng. Pat., No. 11,698, 1908. Full details are given in "B.J.," Mar. 19. 1909, p. 221, and some other particulars in "Phot. Couleurs," Mar., 1909, p. 59; "B.J." (Colour Supplement), July 3, 1908, p. 51.

A further patent of M. Dufay's is one in which a greasy resist is used in the first instance, the plate being then dyed in the unprotected parts, varnished with a preparation which does not dissolve the resist, and the resin of which is insoluble in a solvent of the resist. The varnish may consist of gum-lac dissolved in alcohol. A solvent of the greasy material, e.g., benzole, is then applied, and the surface (thus laid bare) given a second application of the resist over half each area only and again dyed. Finally, after a second removal of the resist a third colour is put in by dyeing the plate as a whole.—Eng. Pat. No. 18,744, 1908; "B.J.," Oct. 8, 1909, p. 786

Recessed Colour Screen-Plates.—L. Dufay has patented the making of screen-film of a kind in which the minute colour elements are formed in the mass of the support. A large number of small, closely arranged recesses is formed in both sides of a thin, transparent support, the recesses preferably having vertical edges. The recesses on one side of the support are then filled up to the level of the intermediate parts of the surface of the support with a transparent, impermeable material coloured throughout in one colour, and the intermediate spaces of the support are then dyed by imbibition with another colour. The other side of the support is similarly treated, so as to produce by superposition with the colours on the first side an optically complete selecting screen suitable for use in colour photography. The colours most suitable for producing this effect are on one side two primary colours, and on the other side the third primary colour and its complementary.—Eng. Pat. No. 15,027, 1912; "B.J.," Aug. 8, 1913, p. 615.

An improvement in the screen-plate described in Eng. Pat. No. 15,027, 1912, is the subject of a further patent. Instead of packing the grooves on one of the sides of the celluloid with a greasy homogeneous material dyed in one of the three colours of the screen—for instance, green—according to this invention the greasy material is mixed with perfectly transparent elements of any shape, but of a diameter slightly smaller than the width and depth of the groove to be filled. These elements, before their incorporation into the greasy material, are dyed with a selective colour—for instance, violet. These coloured particles are introduced into the grooves or other recesses, and only the interstices of the groove which were left free are filled with homogeneous greasy material, which will alternate with the coloured particles in the groove.—Eng. Pat. No. 27,708, 1912; "B.J.," Dec. 5, 1913, p. 939.

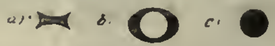
FINLAY'S (AND THAMES) PATENTS.

The Thames Plate.—A screen-plate consisting of two separate sets of circles, providing two of the light-filters, and of a size so that the area of the residual space is equal to the area of either set of discs, has been patented by C. L. Finlay. The sets of discs are first impressed by photographic or mechanical means, and the irregular space thus left is filled by printing through the plate, which has received these two impressions, so as to fill the residual space completely with the third colour.—Eng. Pat. No. 19,652, 1906; "B.J.," Sept. 27, 1907, p. 737.

O. S. Dawson, C. L. Finlay, and the Thames Colour Plate, Ltd., have patented an improvement on the method of manufacturing a screen-plate (the Thames), described in Patent No. 19,652, 1906. According to the new method, a parent plate is produced capable of yielding first a representation of the portion that, in the finished coloured article, corresponds to the space between the differently coloured dot series and the filling, in unalterable positional relationship, colour screens in quantity can be produced therefrom, that, as to such relationship, shall be identical or practically so with the parent plate.

Alternatively, a colour screen, according to the invention, can be produced by the combined use of the process described in the prior specification and mechanical apparatus of accurate construction applied, for instance, to a printing machine using transparent or other inks as is used in the "tin printing" trade, whereby a predetermined and exact, or practically exact, positional relationship between the respective colour series can be effected and repeated in producing colour screens subsequent to the first.—Eng. Pat. No. 4,208, 1910; "B.J.," Feb. 24, 1911, p. 144.

Three-unit Geometrical Plate.—O. S. and H. E. Dawson have patented a pattern of colour screen-plate in which each colour element is obtained of different geometrical shape. The advantage claimed is that in making negatives and positives for the production of duplicates in colour the action of any given colour (red, green, or blue-violet) can be readily seen by examination of the plate with a lens. One method of preparing such screen-plates is as follows :—A cross-line screen as used in the process trade is put near to and in front of a sensitive plate in a suitable camera, the object photographed being a sheet of white paper. In the stop way of the lens is a stop capable, by working in conjunction with the cross-line screen, of so affecting the light-rays that they form on the sensitive plate densities of the shape (*a*) of the figure. Such stop-opening is approximately of the shape of the density (*a*). The shape and size, however, of the stop-opening varies according to the ruling of the cross-line screen, the focal length of the lens used in the camera, and the size of the density patch required.



A second sensitive plate is then put in the camera exactly in the same plane as the previous one, and, using a different stop in the lens, a second negative is made, capable, as before explained, of forming on the sensitive plate, densities of the shape (*c*) of the figure. Such stop opening is approximately the shape of the density (*c*). From these negatives, positives are made, and these become the working screens.

A piece of clean glass, film, or the like is now sensitised by one of the bichromate processes and exposed behind the first positive, thus giving, after development, densities shaped as (*a*). It is then dyed up with one of the selected colours (preferably, red), and the colour patches protected by any recognised method of mordanting or varnishing, or both. The plate is again bichromated and superimposed with the second positive, so that the clear circles of the positive fall in the spaces between the red patches. Printing and development follow, and the circular patches so formed are dyed with another colour (preferably, green) and the colour patches protected by mordanting or varnishing.

The plate is again bichromated, printed through the back, and dyed with the third selected colour, blue-violet, mordanted or varnished. Instead of producing the second colour by using the second positive it can be done by using the second negative, in which case the colour patch will be the shape (*b*) of the figure. Or the two negatives may be so made that the deposits are of the shapes respectively of a solid oval and a solid circle as, for instance, (*b*) (with no opening) and (*c*); in which case we should use the negative (*b*) and a positive of (*c*).—Eng. Pat. No. 5,859, 1912; "B.J.," Feb. 7, 1913, p. 105.

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MONTHLY SUPPLEMENT

ON

Colour Photography.

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THE DUFAY VERSICOLOR SCREEN-PLATE COLOUR FILM.

What appears to be a notable development of the screen-plate system of colour photography is described in the following article. It is the invention of M. L. Dufay who, it will be remembered, was one of the early producers of a colour screen-plate—the Dioptichrome. We had a brief note upon this later invention in the "Colour Supplement" of Jan. 4 last, but may now give a more adequate description of the process from a translation of the original French paper which has appeared in the "Supplement" to the "Scientific American."—Eds., "Colour Photography" Supplement.

Continuing his researches for the past ten years, M. Dufay has invented a process of manufacturing coloured screens on flexible films. The process of manufacture is as follows:—A thin sheet of transparent celluloid is passed between the two rollers A A′ (fig 1), raised to a suitable temperature. If one of these rollers is engraved with extremely fine parallel lines or grooves (fig 2) the sheet of celluloid, softened by the heat of the rollers, will take automatically and exactly the imprint of the lines engraved upon the roller (fig. 2). It will embrace the slightest details, no matter how great the degree of fineness.

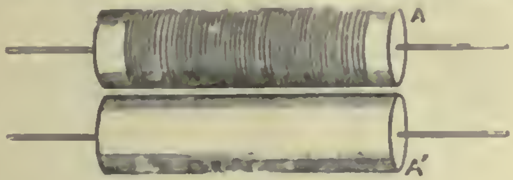

Fig. 1.

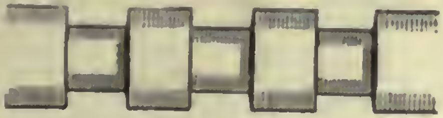

Fig. 2.

When the sheet of celluloid issues from the cylinder it will present in section the appearance shown in fig. 3. The sheet of celluloid thus transformed is now covered on the grooved side with a greasy red substance by means of the distributing rollers of a suitable machine. This substance R (fig. 4) is perfectly transparent. The side thus inked is immediately thereafter properly wiped, as in the case of an engraved copper plate. This wiping will eliminate the excess of grease, leaving bare all the reliefs *b*, but will not remove the grease which has entered the grooves *c* (fig. 4); the surface treated will then present the section shown in fig. 5, *i.e.*, the portions *b* will be left bare and the grooves *c* will be rendered impermeable, coloured red by the grease, and brought up to the general level by the latter.

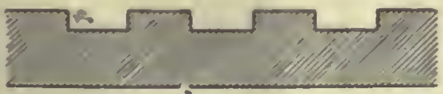

Fig. 3.

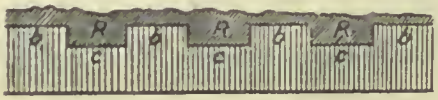

Fig. 4.

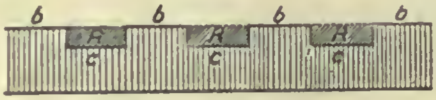

Fig. 5.

If we now pour over the celluloid sheet thus treated an alcoholic solution coloured blue, for example, this blue tincture will be unable to penetrate and colour the celluloid except at the base portions *b*, which remain bare and have not been made impermeable.

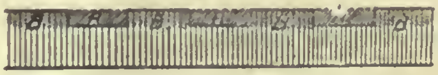

Fig. 6.

After this operation the surface of the celluloid will present a series of parallel lines automatically and exactly juxtaposed, and coloured alternately by the red fatty substance R and the blue tincture B (fig. 6).

That is to say it will constitute a first group of two primary colours, which, it goes without saying, have been previously suitably studied from the optical point of view.

If the same series of operations is repeated later on simultaneously on the other side of the celluloid, supposing the sheet to be thin enough to avoid any damaging ulterior effect of parallax, and if the two colours juxtaposed on this side are, for example, yellow and violet, then by means of superposition and optical fusion we shall have a correct quartet of colours. M. Dufay has applied the following rule to constitute screens of four colours optically correct, capable of a perfect rendering of colours:

Upon a first group of transparent primary colours, exactly juxtaposed side by side under the form of lines, dots, or any microscopic figures whatever, it is necessary (and sufficient) to superpose, in practically intimate contact, a second group of two other transparent colours, namely: the third primary colour, that is, the one not entering into the composition of the first group, beside which its exact complementary is juxtaposed.

Thus we obtain three combinations of screens:

A.—First group composed of yellow and blue juxtaposed, upon which is superposed a second group of red and green.

B.—First group composed of yellow and red juxtaposed, upon which is superposed a second group of blue and orange.

C.—First group composed of red and blue juxtaposed, upon which is superposed a second group of yellow and violet.

These three different quartets constitute equally perfect chromatic filters, and we perceive that such a process leads to important industrial simplifications, since it suppresses the very great difficulty of the juxtaposition of three coloured elements side by side. It also permits us to vary infinitely the form and the arrangement of the coloured microscopic elements, etc.

This new process, which is based on the moulding of celluloid, enables us to obtain automatically screens of any degree of fineness whatever. Thus, in practice, screens have been obtained comprising as high as 900 perfectly transparent geometric coloured elements juxtaposed alternately with mathematical accuracy in a square millimetre.

Upon a film prepared as above, and rendered capable of selecting and recording all the colours of the spectrum, is spread a layer of negative emulsion, extra rapid and properly panchromatised.

The film is now ready to be cut into any shape desired to be employed in any apparatus in current usage, kodaks, cinemas, and so forth, or mounted on glass to be used in apparatus which employs plates.

The taking of the view, the development, and the fixing are done in the ordinary manner; but the negative, after being developed and fixed, exhibits the remarkable peculiarity of reproducing all the complementary or negative colours of the subject photographed; it will be an anti-chromatic negative, which can be utilised for multiplication and printing by contact an indefinite number of reproductions of the image in colours.

If, in fact, we print this anti-chromatic negative film, by contact, in an ordinary printing frame, on a film which itself also bears a selective screen created by the above process, but covered with a positive emulsion, making use (for the printing) of either ordinary daylight or of artificial light, a new selection will automatically occur during the impression; the negative or complementary colours of the negative will be printed on the positive film, yielding this time an image in the real colours of the subject photographed.

It makes little difference, of course, whether there is, during the printing, concordance or not between the coloured divisions of the negative screen and those of the positive screen, these coloured divisions being so minute as to constitute practically a continuous model.

AVOIDABLE PITFALLS IN MAKING AUTOCHROMES.

[The following notes on the working of the Autochrome process, which appear in the current issue of "American Photography," will, most of them, be familiar to regular Autochromists, but may provide among them a caution for others less experienced in the handling of the Lumière plates.—EDS., "Colour Photography" [Supplement.]

ANYONE setting out to make Autochromes should provide himself with an exposure meter or exposure chart of some kind, no matter how experienced he may be, and stick to its teachings. I cannot make this point too strong, if you want to obtain uniform results. In my experimenting I tried several, so think that they are all workable and practical, once the tendency of the Autochrome to be under-exposed under certain light conditions that I call heavy is understood. It is always best, even more than in ordinary photography, to err on the side of over-exposure.

Good working instructions are furnished by the makers, so simple that anyone unable to follow them should leave Autochromes entirely alone. In placing Autochrome plates in holders do not press on or rub in any way the film side of the plate; hold your plate together with the card backing by the edges only, thus avoiding one way in which the delicate film may become ruptured, which is the cause of unsightly green spots. These are difficult to spot or fill in if they come in the lighter parts of the composition; and if the Autochrome be a portrait, the end of the nose or the middle of a pretty pink cheek seem to have particular attractions for these spots—there may be an undiscoverable "why" here. If in landscape or garden views, you compose your picture to have as little sky as possible, you may save yourself many disappointments on account of these green spots, for if they appear in the foliage a careful worker can spot them so that they will be indiscernible to the ordinary observer.

In developing the Autochrome, the careful worker will be sure that the pyro-ammonia developer is up to strength. I lost many plates which proved to be undeveloped on account of the ammonia becoming weak.

For reversing the plates the bichromate solution is preferable to the permanganate, being much cleaner to work with and never causing small black spots as the permanganate sometimes will.

For the second developer always use a non-alkaline developer such as dianol, amidol, or one of similar nature, and then you will not have to tell the fisherman's story of "it got away." The thin film of the Autochrome plate is extremely sensitive to any condition that tends to soften or melt it, and unless the temperature of your solutions and subsequent washing waters is exactly right the chances are that if a developer of a nature other than I advise for the process be used you'll see your picture, always the best one, slide off the glass—an expensive way to get clean glass. But never once have I lost a plate in this manner when using dianol for the second developer, and this point is as important as the use of a meter if you wish to follow an Autochrome "safety first."

Several times during warm weather I found defective places on my plate, and accused the emulsion of being thin, as the image was very weak on these spots. One day I saw one of these spots slowly appear (the emulsion melting directly over the top of my finger which was supporting the weight of the plate from the back) so again—hold your plate by the edges only.

My recommendation of full, if not slight over-exposure, is because of the desirability of intensification, if the best technical results are wished. While this is rather "messy" on account of the silver stains produced on the hands it is easily and quickly accomplished. If the plate was properly exposed and developed, it is well worth this extra trouble because of the increased brilliancy and clearness obtained. The silver stains referred to are easily cleaned up by rubbing dry permanganate of potash crystals well into the hands; they will look almost jet black, but this is easily bleached out, taking all stains with it, by well washing the hands with liquid sodium bisulphite. Rinse the hands between the two solutions with water, which will prevent almost all smarting.

After varnishing and spotting plates if necessary, they should be carefully bound with a cover glass for protection; moisten the binding tape only sufficiently to make it adhere, or the surplus water will run between the Autochrome and the cover glass, adding a rainbow effect sufficient to ruin an almost completed perfect Autochrome. This is from bitter experience.

No formulæ have been given here, as they are all in the instruction booklet furnished by the manufacturer, and are easily prepared. The painstaking follower of them is assured of excellent results, if he will bear in mind the pitfalls shown here, which were the cause of all my early failures.

I have strong doubts of any process to come in future years outdoing the Autochrome for realistic results when it is properly shown in a diascope, the mirror of which aids in giving a perspective to the "picture" not easily to be obtained by a directly-viewed picture of any kind except a stereogram.

WILL ROUNDS.

DECENNIA PRACTICA—COLOUR PHOTOGRAPHY.

Under this heading we apply to the various branches of colour photography the processes of collection and arrangement accorded to some fifty departments of ordinary photography in the "B. J." during 1916. These extracts are from issues of the "British Journal Almanac" of the years 1906 to 1915, and the present series of epitomes thus resuscitates and brings together in compact form much useful information, otherwise scattered through nearly a dozen volumes.—EDS. "Colour Photography" Supplement.

PROCESSES OF MAKING COLOUR SCREEN PLATES.

[In regard to these extracts from the "Almanacs" of the years 1906 to 1915, processes relating to the Autochrome and Paget screen-plate colour processes will not be found among them since they appeared in a previous instalment, namely, that in the "Colour Supplement" of August 3, 1917. The processes here dealt with are arranged in alphabetical order of the patentees' names in those cases where several patents stand in the name of a single experimenter. Single patents will be grouped in a class by themselves at the end in this alphabetical series.]

KRAYN'S PATENTS.

Screen-Plates and Screen-Plate Prints.—Robert Krayn has taken out a further patent in connection with the method of making and using multi-colour screen-plates, as specified in patent No. 1,958, 1906 ("B.J.," July 6, 1906, p. 534), viz., by section-cutting. The patentee now proposes to produce from these line screens others which are composed of a number of coloured points. This is done by uniting line screens (of a thickness equal to the thickness of their lines and produced in accordance with the previously mentioned methods) so as to form a homogeneous block, which is then cut into sections transversely to the lines of the layers of which it is composed.

The invention makes it possible to produce positives, which appear as coloured photographs when seen from above, so that they make the impression of naturally coloured pictures on paper.—Eng. Pat. No. 495, 1907; "B.J.," Jan. 17, 1908, p. 44.

R. Krayn has also patented a further process of preparing celluloid sections consisting of bands of the three primary colours, but with a proportion of white substance, such as porcelain, in the body of the celluloid.—Eng. Pat. No. 2,213, 1908; "B.J.," April 24, 1908, p. 330.

Limits of Krayn Process.—Dr. Stenger, in alluding to the patents of O. N. Witt and R. E. Liesegang in 1889 for a process similar to that of Krayn, deals with the method of the Deutsche Raster Gesellschaft (Krayn's patents) of producing film screen-filters of 180 lines per inch. As regards their use for cinematograph work, he demands a screen of at least 500 lines per inch in order to obtain the necessary fineness on the screen. A 180-line screen, projected as a cinematograph positive with 80 to 100 times magnification, would have bands of 14 mm. breadth. He doubts the possibility of preparing such screen-films of celluloid, and further queries the possibility of their being strong enough to stand the wear and tear of the cinematograph projector. Another point is the thickness of the colour band in reference to its width. As a cinematograph film must be at least .1 mm. thick, and if the colour bands are only 1·20 mm. broad (1·500 inch) as they require to be, great error, due to parallax, is bound to occur. "Phot. Chron.," Feb. 16, 1908, p. 87; "B.J." Colour Supplement, March 6, 1908, p. 23.

Screen-Plate Coatings in Dyed Gelatine.—R. Krayn has patented the method of preparing a screen film (Deutsche Farben-films) based on the fact that dyed gelatine may be rendered immune to the action of other dye solutions by treating it with a tanning material which is a mordant of the colouring matter used. Thus, in preparing the screen-film a gelatine surface is coated with a greasy ink in those places which are not to take the first colour. The film is then dyed, say in cinnabar scarlet G. It is then placed in ferric chloride solution, which tans the gelatine, and the excess of colour rinsed off. The film is dried and the greasy impression then removed with turpentine. The next step is to print a second impression in greasy ink and to dye with the second colour, say the blue, *i.e.*, methyl-blue for silk M.L.B. of the Hoechst colour works. In this bath the red units already stained are unchanged, and when the blue has acted on the film the latter is again treated in ferric chloride, washed, dried, and the second greasy resist removed. The third colour, the green, is chosen from dyes which are repelled by the two preceding colouring matters thus tanned. For this a mixture of Hoechst patent blue A and Hoechst yellow E is used, and is likewise mordanted by means of ferric chloride. The screen is then varnished and coated with emulsion.—Eng. Pat. No. 26,911, 1909; "B.J.," Nov. 4, 1910, p. 839.

Describing these screen-films, prepared according to the Krayn patent, Dr. W. Scheffer gives the breadth of the lines as 0.04 mm. The screen-coating is supported on celluloid 0.13 mm. in thickness, the coating itself having a thickness of 0.005 mm. A protecting film overlying the screen-coating is also 0.005 mm. in thickness, whilst the emulsion, either positive or negative, is 0.02 mm. in thickness. The total thickness, therefore, of the whole film, when fully coated, is 0.16 mm.—"B.J." Colour Supplement, Dec. 2, 1910, p. 89.

POWRIE'S PATENTS.

Early Announcement.—A modification of the Joly process is that of John H. Powrie, of Chicago, who prepares a commercial plate (the "Florence") with the filter-bands by a photo-mechanical process, and then coats with a pan-chromatic emulsion. The result is a negative with colours, as well as light and shade, reversed. Positive prints or lantern slides are printed from these negatives.—"Illustrator," April, 1905, p. 389.

Bichromate-Printed Line Screen-Plate.—John H. Powrie describes the screen by which direct photographs in colour are obtained at one exposure in an ordinary camera by a modification of the Joly process. A banded filter is made on a glass plate by coating with bichromated gelatine and printing from a line pattern or stencil of opaque bands which are double the width of the intervening clear line, and finally staining with the required colour. This process is repeated three times altogether to produce the three interspersed series of colour bands, and the screen is then used as a separate filter in contact with a plate, or an emulsion coated on it and exposure made through the glass.

For hardening the gelatine after each staining operation a bath is used, containing about one pound of tannic acid in a gallon of water —Eng. Pat., No. 20,662, 1905; "B.J.," June 8, 1906, p. 454.

An account of the Powrie-Warner process appears in "Penrose's Pictorial Annual, 1905-6," and is reprinted in "B.J.," Dec. 29, 1905, p. 1,029.

Fine-Structure Screen-Plate.—Dr. W. Scheffer has described a new type of screen-plate prepared (spring of 1909) by the promoters of the Warner-Powrie process. The plate is of geometrical pattern, consisting of red and blue areas and crossing green lines, its fineness of structure is almost that of the Autochrome, and the separate elements show very uniform colouring throughout each unit area.—"B.J." (Colour Supplement), June 4, 1909, p. 43.

RUTH'S PATENTS.

Grain Colour Screen-Plates.—R. Ruth has patented a method of preparing a screen-plate in which an irregular distribution of filter units is formed of solidified drops of a liquid coloured mass. For this purpose a suitably coloured solution, adapted to dry or solidify easily in air, or a resin or a colloid of any appropriate kind, is scattered in any known manner, and the height, through which the fine drops produced by the scattering of the liquid fall, is so selected that the drops solidify or dry during their descent.

For example, a gelatine solution more or less strong, as may be required by the atmospheric conditions, is dyed with methylene blue and scattered in a chamber kept at a suitable temperature. If the height above the receiving surface at which the scattering is effected is sufficient, the gelatine settles in small coloured dry particles, and can be mixed in this pulverulent form with red powder and a green powder made in like manner, and used in accordance with any known process for making colour screens, such as by being applied to a sticky layer, or the scattered dry particles may be received on such a layer.—Eng. Pat. No. 16,273, 1910; "B.J.," Oct. 28, 1910, p. 824.

A supplementary patent of R. Ruth, No. 25,998, 1909, is described in "B.J.," Nov. 25, 1910, p. 899.

R. Ruth and A. Schuller have patented a method of preparing a plate, which consists in dyeing each colour element with two dyes of the same colour but of different natures, one of which can be removed after the picture has been taken; the dyes being chosen so that the two sets of dyes together make a screen sufficiently deep for taking the picture, while the set of dyes which remains after the removal of the other set form a screen sufficiently light to produce a satisfactory picture with a paper or other white opaque backing in contact therewith.

The patent specification gives the names of dyes suitable for use with starch grains or with resin, as also of dyes suitable for applying the process on the bleach-out system.—Eng. Pat. No. 22,451, 1912; "B.J.," Oct. 24, 1913, p. 823.

SMITH'S PATENTS

Geometrical Filter Screens.—Dr. J. H. Smith patents different patterns of screens, consisting of three sets of colour filters, distributed geometrically throughout the area of the screen as triangles, hexagons or rhombuses, and so arranged that at every point where these unit areas meet all the colours in the screen are represented once or several times.

If the screened surface is upon a glass or other transparent support, the screen can be used placed face to face upon a suitably prepared colour-sensitive plate for taking a negative, or for viewing in colours the positive copied from such a negative. When the screened surface is required upon paper or similar material upon which printed impressions may be made, a screened relief surface may be employed for the production of polychrome prints by means of a photo-mechanical process.

The method of printing on film may be the same as that for printing on paper. In the case of glass, Dr. Smith advocates the following process :—A suitably reduced and sharp negative is taken upon a sensitive plate. From this negative three positives are printed upon bichromated gelatine surfaces, one of the gelatine supports being glass, the other two celluloid or collodion films. After washing out the soluble gelatine the positives are coloured in suitable solutions, e.g., one in red, the second in yellow-green, and the third in violet-blue colour. The celluloid or collodion films are then laid upon the glass plate, and, by means of a magnifying glass, brought into register so that the colours are regularly distributed. In this position the films are cemented securely upon the glass plate, e.g., with Canada balsam, and the whole forms the taking screen, which in taking a negative is placed upon a panchromatic plate, the screen surface being towards the plate. From the resulting negative a positive is made, and this positive is viewed through a similar colour screen in the corresponding colours, whereby the photograph appears in natural colours.—Eng. Pat., No. 6,881, 1906; "B.J.," June 22, 1906, p. 494.

Intaglio-Printed Screen-Plates.—The German patent No. 197,610, of Dr. J. H. Smith, Dr. W. Merckens, and H. B. Manissadjian, for the preparation of colour-screens for photographic purposes deals with the making of mosaic colour-plates by a process of intaglio printing, it being found that the methods of typographic printing are incapable of giving the necessary intensity and covering power of the colours. The following is described as an advantageous method of carrying out the process :—Soft paper containing as little size as possible is coated with gum arabic, or a similar easily soluble substance, and a soft collodion film applied thereto. The colour mosaic is printed on this substratum, and is afterwards transferred to glass. The transfer to glass or other transparent support is done by squeegeeing the paper in a wet condition, and subsequently stripping it away. The screens so obtained on the transparent support were coated with a panchromatic emulsion. It is also possible to print on the so-called stripping paper, and to transfer the screens so obtained in the usual way on to a transparent support. In this case there is no special film as the carrier of the screen, and thus the difficulty that parts of the screen may separate cannot occur. The advantage of the above-described method lies in the fact that an extremely thin collodion film no thicker than 1-100 mm. can be used, and it dispenses with a special protected film between the screen and the emulsion.—"B.J." Colour Supplement, June 5, 1908, p. 45.

COLOUR PHOTOGRAPHY OF THE BATTLEFIELD.

It has been reserved for an Australian war photographer, Mr. F. Hurley, to present in London the first real colour photographs to be publicly exhibited of scenes and incidents of the war. These are now being shown in a series of lantern séances at the Australian exhibition of war photographs at the Grafton Galleries, New Bond Street, London, W. They are all of them made by the Paget colour process, and are half-plate transparencies projected upon a full-size lantern screen. The set which we saw at one of these half-hourly exhibitions contained many transparencies which testified to the fine technical quality of the process and equally to the skill and intrepidity of the photographer. It is a pleasure to encounter the work of Mr. Hurley in this war field. His proficiency as a landscape photographer is not unknown to us. Reproductions of his work with the camera as a traveller in countries south of the Line must be familiar to readers of the Australian papers, and it is not so long ago that a number of the "Photo-Miniature" gave some insight into the methods which he is accustomed to employ in producing photographs which owe their quality as much to the photographer's sense of the picturesque as to the intrinsic interest of the subjects. This experience and habit of thought have stood Mr. Hurley in good stead in the shell-devastated areas of Flanders as well as in the Palestine deserts. It was interesting to note the advantage taken in many of the coloured photographs of the contrast between the wealth of flower and foliage in France and the ruin wrought by warfare close at hand. In Palestine equal opportunities, but connected chiefly with strong effects of lighting and picturesque Eastern costumes, are turned to advantage. Visitors to the Grafton Galleries should on no account miss seeing this application of the Paget process to the rendering of scenes of the greatest imaginable interest.

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MONTHLY SUPPLEMENT

ON

Colour Photography.

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THE CHARM OF AUTOCHROMES.

[An eloquent tribute to the degree to which the results by the Autochrome process satisfy those who crave for the fullest and most complete form of photographic reproduction is paid by Dr. T. W. Kilmer in the following article, which we reprint from the "Photo-Era." Apart from its subject proper it touches upon a point which, so far as we recollect, has not previously been remarked upon, namely, that for each individual there is an *f* number of the lens yielding a degree of definition which most correctly corresponds with the visual impression obtained by the photographer. Dr. Kilmer, it should be observed, deals with this phenomenon in relation to the use of soft-focus lenses, with which, by the way, he finds that shorter exposures are required on the Autochrome plate than when using fully corrected lenses at the same *f* number.—EDS., "Colour Photography" Supplement.

WE all of us—after many years of processes photographic—yearn for an indescribable something which we have been unable to acquire. If one be a lover of nature—without which one cannot be a real student of photography—he often wishes to perpetuate for record, sentiment, or artistic effect some view which his eye has admired. He wishes to portray this view in all the colours, tints, and hues with which nature has endowed it. I think that most of the real, hard-thinking, discriminating people who take up photography for the love of the thing finally arrive at the same point at which I found myself during this past year. I had admired photographs in monochrome, had taken thousands—yes, seemingly millions—of them during the past twenty-five years of my photographic life, yet I had reached a point of photographic unrest. I wanted to portray my scene in the natural colours and with the same softness with which my organs of sight registered it upon the sensitive nerve-endings of my retina. I had tried about all of the colour-processes and multiple printings known to man. I had used all the types of lenses ever constructed. I felt as if I desired to attain the unattainable. I did not desire to record many pictures, but there were yearly some twenty to fifty scenes that I had dwelt upon, some many times, others but occasionally—scenes, places, and a few persons, all of which I wished to preserve forever just as I saw them, so that in the years to come I could visually feast, as it were, upon the memories of bygone days. How should I accomplish this? I experimented with about every combination known to myself and to my friends. I wanted the view preserved just as I saw it. The first point to be settled was, How did I see it? Certainly not through a hard, anastigmatic organ of sight, and certainly not through a greatly diffused astigmatic organ of sight. Being a strong devotee of the soft-focus lens—because we all have soft-focus eyes—I wandered afield with a 3¼ by 4¼ camera equipped with a five-inch soft-focus lens. I had, as many of us have, a favourite view near my summer residence, and I determined to fuss around until I obtained the same diffusion on a dry-plate that I did with my eyes when I looked through them at this favourite view of mine.

I made many exposures with my lens at various apertures, all the way from full aperture (*f*/6) down to *f*/32. I exposed on this favourite view in the early morning, bright sunny noon, and dusky evening, cloudy days and bright days. I frequently held a mirror over my shoulder and peered into it at the view that I might better judge as to how I really saw that view. After repeated trials, I determined that the lens-stop which best suited my individual vision was *f*/8. I interrogated several of my friends, and found that each had his own special visual stop-number—that is, each person saw that view best, or rather the view appeared to him best, at a certain *f*/ number. It therefore seems to me that everyone has his own individual "visual index," comparable to a certain fixed diaphragm number. For example: A said that the view appeared more natural to his eyes when a print was shown him taken at *f*/6. B said that the view looked more natural when taken at *f*/7. C said that A and B were both wrong, to his eyes, the view looked the way it did in nature when taken at / Different persons looking at the same print all have different ideas as to its merits, and I believe that part of the reason for this difference lies in the fact that each person has his "visual index," at which a certain view looks its best to him. Therefore, to determine the photographic visual index of any individual, it is necessary for him to make a series of photographs of the same view with the various stops of a soft-focus lens, and select from the prints thus obtained the one which most resembles this view when seen by the eye.

Approaching the subject from this definite point, I felt satisfied that I had solved the first horn of my dilemma, namely, as to how I really *saw* the view that lay before me.

The next step was for me to record permanently this view in its natural colours. I tried all the various colour-process plates; I coloured the scene by hand upon the finished print; I made lantern-slides, and tried to colour them true to nature. I had expert artists colour prints and slides for me from colour notes made by me at the time of taking the photograph. After thorough experimentation, I decided upon using Lumière Autochrome plates as lantern-slides. A view taken upon one of these plates through a soft-focus lens at the correct "visual index," and projected by means of a small, compact stereopticon upon a screen of not too large dimensions, say of 4 by 5 feet, is to me the acme of perfected photography. I had all that I desired; there was my view in all its colours, seen upon the screen just as I had seen it in nature. If you feel that you have seen everything that there is photographic, that you have reached the point where there is nothing more to be done in photography, I beg of you to purchase a few Lumière Autochrome plates, make some slides as I shall tell you, using a soft-focus lens at your own individual "visual index," and project them upon a small screen. You will have a pleasure in store for you. The makers of the Autochrome plates give you full directions in each box of plates, and, better still, is their little booklet. There are, however, just a few "wrinkles" in handling these plates which I have never seen in print. I shall therefore describe in detail the steps in making an Autochrome visual-index slide. It is very easy to accomplish. Load your plateholder with the Autochrome plate in total darkness. Do not carry a filled plateholder in your pocket or on the floor of an automobile, especially over the hot engine. Do not fill the holders until the day you are to use them. Develop your plates as soon as you can after exposure. It seems to me that, when using a soft-focus lens in this work, the exposure is lessened very appreciably, and an Autochrome can be made in less time, and at the same stop, than would be required when using an anastigmat lens. I should advise that the yellow Autochrome screen be screwed on or into the lens, as this ensures a perfect parallel. By all means use some form of lens-hood; your results will be better. It is very necessary to give a full exposure when using these plates for stereopticon work, as this slight overexposure gives the required clearness to the slide, ensuring the finest results. I find that with my soft-focus lens set at $f/8$, an exposure of one second, at twelve o'clock, on a bright sunny day, is about right, although, if I want to get a perfect sky, I would advise an exposure of three-quarters of a second. Along toward evening (six o'clock), I give six seconds with good results, and develop the plates in total darkness.

You will hear it said, "Autochromes are too dense for lantern-slides"; so they are if they are made by someone who does not know how to make them, or are projected upon too large a screen. My screen is not larger than 4 by 5 feet. Any good lantern equipped with a white light, such as the electric arc or nitrogen bulb, and a water-jacket to protect the Autochrome lantern-slides, will suffice as a projector, and it will do good work.

Those of us who do not make pictures to see how *many* we may produce each year, and who do not snap every pretty view which we see, but who wish to record a few worth-while scenes, views which mean much to us and which we wish to preserve as lasting documents, by all means should record them according to our individual visual index and in their true colours; for by so doing we shall not only give ourselves a lot of pleasure, but store up a true scenic library for our friends and posterity.

T. W. Kilmer.

DECENNIA PRACTICA—COLOUR PHOTOGRAPHY.

Under this heading we apply to the various branches of colour photography the processes of collection and arrangement accorded to some fifty departments of ordinary photography in the "B. J." during 1916. These extracts are from issues of the "British Journal Almanac" of the years 1906 to 1915, and the present series of epitomes thus resuscitates and brings together in compact form much useful information, otherwise scattered through nearly a dozen volumes.—Eds. "Colour Photography" Supplement.

PROCESSES OF MAKING COLOUR SCREEN PLATES.

[In regard to these extracts from the "Almanacs" of the years 1906 to 1915, processes relating to the Autochrome and Paget screen-plate colour processes will not be found among them since they appeared in a previous instalment, namely, that in the "Colour Supplement" of August 3, 1917. The processes here dealt with are arranged in alphabetical order of the patentees' names in those cases where several patents stand in the name of a single experimenter. Single patents will be grouped in a class by themselves at the end in this alphabetical series.]

Palmer's Patents.

Ceramic Screen-Plate.—H. W. H. Palmer has patented a method of preparing the screen-plate for colour photography by the following method :—Glass plate is first of all coated with a suitable tacky substance, and then with ceramic colours or fluxes in the proper proportions of the necessary colours to form a three-colour filter-plate. This coloured coating is then fired in a kiln or furnace, leaving a coloured transparent glaze formed of the minute particles of the colouring matters. The treatment in the furnace fills up any minute space between the coloured particles. The colours used are composed of silica, minium and borax (with saltpetre, added if necessary). This base is coloured with oxide of cobalt for the blue, copper oxide or oxide of chromium for the green (with the addition of ferric oxide to either of the former for the red), ferric oxide or chromate of lead for yellow or orange and gold, with oxide of tin for magenta or pink.—Eng. Pat. No. 22,228, 1907; "B.J.," Nov. 13, 1908, p. 873.

Zone-Pattern Colour Screen-Plate.—H. W. H. Palmer has patented a pattern of screen-plate in which the colour elements are distributed in concentric circular bands, the method of preparation being by impression from a die or other known means—Eng. Pat. No. 17,309, 1908; "B.J.," Sept. 3, 1909, p. 689.

Photo-Mechanically Prepared Screen-Plates.—H. W. H. Palmer has patented a method of preparing colour screen-plates by three separate impressions from a relief printing block prepared by a photo-mechanical method.—Eng. Pat. No. 8,761, 1910; "B.J.," Aug. 4, 1911, p. 597.

Spath's Patents.

Geometrical Screen-Plate.—Carl Späth has patented a process of preparing a three-colour screen-plate from a line-screen original. A plate is sensitised with bichromate, printed under the line screen, and dyed in a mixture of two dyes, one of which attaches to the exposed and the other to the unexposed parts of the gelatine. The excess dye is washed out, the plate re-sensitised with bichromate, and again printed from the line screen, this time at an angle, being finally washed and dyed.—Eng. Pat. No. 3,601 of 1909; "B.J.," Dec. 3, 1909, p. 936.

Colour Screen Film.—C. Späth has patented the following process of manufacture of a colour screen film :—A celluloid film is covered on both sides with a protective layer by dipping into a solution of rubber in benzole, and in one of these layers a series of lines are scratched in such a manner as to expose the celluloid surface. The film is then dipped into a solution of blue dye, which is, for instance, obtained by dissolving 2 gms. of Victoria blue in 100 c.c.s. of absolute alcohol. The film is rinsed in water, in order to wash off the excess of the dyes. The protective layer is then again cut up into parallel lines, preferably arranged at an angle of 90 deg. to the direction of the first ruling, and these second lines also reach only to the celluloid surface. The celluloid surface will be thus decomposed into blue and non-coloured lines, the latter of which are alternately decomposed into protected and unprotected squares.

By dipping into a solution of 2 gms. auramine and 1 gm. ethyl green in 150 c.c.s. of alcohol of 80 per cent., the unprotected parts will be coloured green, whilst the portions already coloured blue will remain unaffected owing to the greater dilution of the solvent.

The remaining portions of the protective layer are then washed off from the celluloid film, which now represents a screen consisting of blue lines and green squares, and the third colouring can be effected with red dye stuff in a still more diluted solvent. To that end is used, for instance, a solution of 2 gms. of rubin and 1 gm. auramine in 150 c.c.s. of alcohol of 60 per cent. When the screen is treated with this stain only the non-coloured portions will be stained. The result will therefore be a colour-screen consisting of blue lines and green and red squares, and the non-treated protective layer is then removed from the back of the colour-screen in any well-known manner.—Eng. Pat. No. 23,138, 1910: "B.J." Jan. 13, 1911, p. 30.

SZCZEPANIK'S PATENTS.

Screen-Plate Prints.—Jan Szczepanik prepares a three-colour screen-plate by impressing coloured lines either upon the support of the emulsion or upon the sensitive layer itself in such a way that the primary colours lie one above the other and cross each other.

The process is suggested as suitable for the making of screen-plate prints on paper, in which case a thin, transparent coating is first applied to the photographic film and the mosaic impressed upon the former. If necessary, development can take place through the mosaic.

The conversion of a negative into a positive, or of the positive into a negative, can easily be effected by this process, provided the coloured mosaic be placed upon a very slightly sensitive photographic coating—for example, upon a print out or copying layer—and if upon this coating there be applied a panchromatic emulsion adapted to be easily stripped. As the coating of print-out or copying emulsion is almost non-sensitive in comparison with the panchromatic emulsion, little effect can be produced therein during the exposure to light. The panchromatic coating will be fixed as a negative if a positive be copied, thereupon the plate is exposed to the light in such a way that the negative appears on the printing out or copying coating as a positive, the negative being stripped off and the positive present underneath treated further, i.e., developed, toned, and fixed, or the like.—Eng. Pat. No. 6,098, 1907; "B.J.," Nov. 1, 1907, p. 829.

Imbibition-Process Screen-Plate.—Jan Szczepanik has patented methods of preparing the mosaic colour filter which are based on the behaviour of acid basic dyes towards vehicles such as gelatine, collodion, etc. Three lots of fine gelatine particles, each stained with a suitable dye, that is one having a stronger affinity for collodion than for gelatine, are mixed together and applied to a tacky collodionised substratum. The dyes migrate into the collodion surface, leaving the powder colourless. Where coloured particles overlie each other, uncoloured patches may be formed in the substratum, but this defect may be remedied by, say, applying only two lots of particles and afterwards producing the third colour by treating the support in a bath containing the third dye dissolved in a substance such as gelatine from which the dye will pass into the collodion.

A number of variations of this method are described. The substratum may be sprayed with coloured liquids containing gelatine, or a portion of the plate may receive an impression (pattern) in colourless gelatine, and a second impression given in a varnish colour. The whole plate may be then immersed in a mixture of dyes (e.g., methylene blue and erythrosine) which will not affect the varnish impression, but will stain the gelatine red and the collodion blue.

Another method is to stain a set of three filaments with three colours and form from them a tissue or fabric.—Eng. Pat. No. 17,065, 1908; "B.J.," Nov. 13, 1908, p. 874.

Szczepanik-Hollborn "Veracolor" Screen-Plate.—Dr. F. Limmer has contributed notes dealing with the share taken by Dr. K. Hollborn, of Leipsic, in working out the Szczepanik process of preparing a screen-plate by applying dyed particles of gelatine to a collodion surface; the dyes transferring themselves from the gelatine to the collodion. It was found easier to obtain a fine powder when using gum in place of gelatine. It was also found that the condition of such transference is the presence of a slight proportion of the substance in which the dyes are soluble. A mixture of gelatine and cane-sugar was found to serve very well in conjunction with dyes soluble in water and alcohol. Afterwards milk-sugar alone was used, and it was found well to add a substance to the collodion which prevented it drying too quickly. Two of the dyes are applied by transference, and a third by a bath of colour.—"B.J." (Colour Supplement), July 2, 1909, p. 49.

VEREINIGTE KUNSTSEIDE FABRIKEN'S PATENTS.

Section-Cut Gelatine Screen-Plate.—A German patent, No. 197-749, of March 7, 1907, has been granted to the Vereinigte Kunstseide Fabriken of Kelsterbach á/M. The process appears to consist in the production of a screen by super-imposition of sheets of gelatine, the whole block, before cutting the screen, being subjected to strong pressure, by which each sheet of gelatine is squeezed to a thinner substance.—"B.J." (Colour Supplement), June 5, 1908, p. 45.

Celluloid Mosaic Screen-Plates.—The Vereinigte Kunstseidefabriken A.G. have patented the following method of preparing a three-colour mosaic filter-screen from an engraved or etched metal matrix:—The process consists in forming a pattern in relief on the celluloid sheet by hot pressure against the etched plate, the depressions in which form the portions raised above the celluloid surface. The latter is then inked like a printing-plate with greasy ink or varnish, which is thus applied to the raised lines or bands. The whole sheet is then treated in an alcoholic bath of dye whereby the depressed portions absorb colour, and the greasy ink then removed. The sheet is then placed across the etched plate at right-angles to its former direction, and a second hot pressure given, the raised lines again inked, and a second application of alcoholic colouring solution, such as malachite green, carried out. A two-colour screen is thus obtained with lines crossing each other at right-angles: the raised portions left uncovered at this stage are given a coating of dye by any suitable method, such as sensitising with bichromated gelatine solution, exposure to light and dyeing in an aqueous dye solution. The process is completed by hot pressure of the whole sheet between flat plates in order to get rid of the relief.—Eng. Pat. No. 21,739, 1908; "B.J.," Feb. 19, 1909, p. 146.

The Vereinigte Kunstseidefabriken A.G. has also patented a process of preparing a mosaic multicolour screen-plate of any pattern, regular or irregular, the essential part of the invention being that no resist or protecting medium is used in order to obtain the distribution of the colour elements. The distribution of the dyes is obtained by a method whereby one set of dyed portions (after being dried, and when the whole plate has been immersed in a second different dye solution) does not absorb this second colour, provided that the latter's time of action is short. Nevertheless, even with this short dyeing with the second colour sufficient intensity of this latter may be obtained. Dyes which are named as suitable for the process are crystal violet for the first dyeing, malachite green used for about three seconds, and rhodamine G used for about one second. The dye solutions above mentioned are used in equal alcoholic saturated solution.—Eng. Pat. No. 21,840, 1908; "B.J.," May 28, 1909, p. 426.

Screen-Ruled Roll Film.—Colin N. Bennett gives photomicrographs of a screen-film, stated to be made by the Vereinigte Kunstseidefabriken A.G. (presumably by one or other of the processes mentioned above). The film is of very fine ruling, of less opacity than the Autochrome, whilst the prevailing tint is a very slight tinge of green.—"B.J.," Colour Supplement, Sept. 2, 1910, p. 66.

BRITISH DYES: SPECTRUM CURVES OF COLOUR SENSITISERS AND ABSORPTION CURVES OF FILTER DYES.

The introduction of a series of dyes, replacing those previously obtained from the German chemical factories, for the colour-sensitising of gelatine emulsions and for the making of orthochromatic filters and dark-room safe-lights has naturally prompted the request, on the part of many of our readers, for data as to the colour-sensitising effect of the dyes introduced for this purpose, and as to the absorption properties of those employed for filters. As is now widely known, these series of dyes, prepared by processes worked out by Professor W. J. Pope, of Cambridge University, are supplied by Messrs. Ilford, Limited, who, during the past year have gradually added to the number of colouring matters which are now available for their several photographic applications. By courtesy of Messrs. Ilford, Limited, we are enabled to reproduce spectrographs showing the sensitising action of the individual colour-sensitisers and of mixtures of them, and also the absorption properties of the chief dyes now available for filter-making. The curves here reproduced and made in the experimental laboratories of the Ilford Company should serve to provide experimenters with the technical information in regard to these new products which they need.

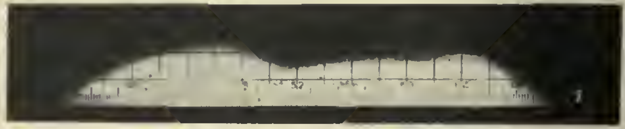


Plate bathed in "Sensitol" Red.

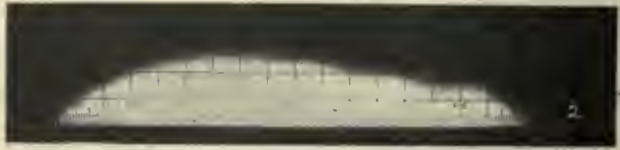


Plate bathed in "Sensitol" Green.

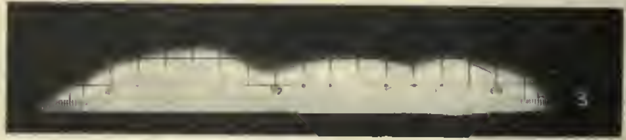


Plate bathed in "Sensitol" Violet.

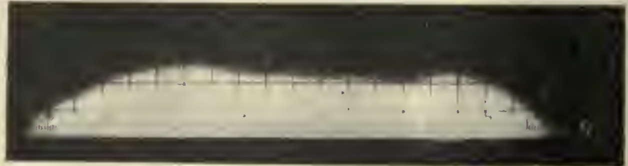


Plate bathed in "Sensitol" Violet plus "Sensitol" Green.

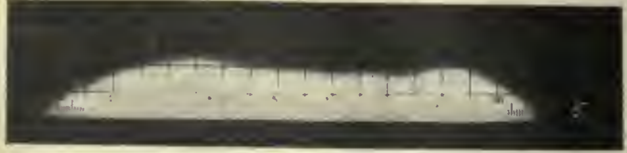


Plate bathed in "Sensitol" Red plus "Sensitol" Green.

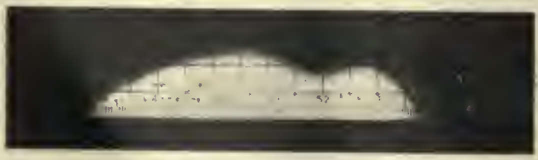
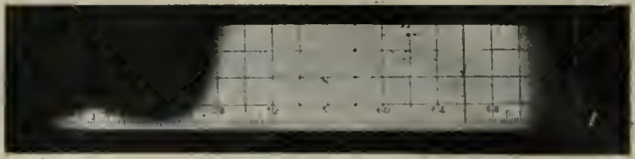
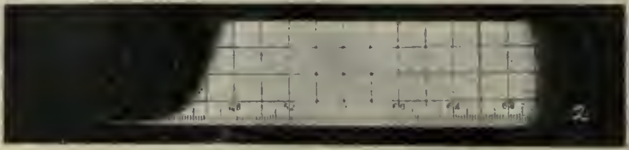


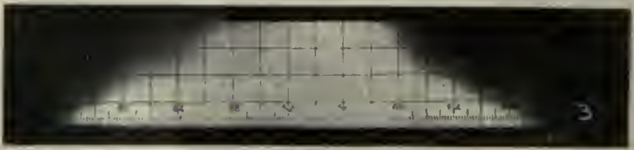
Plate hed in Erythrosine.



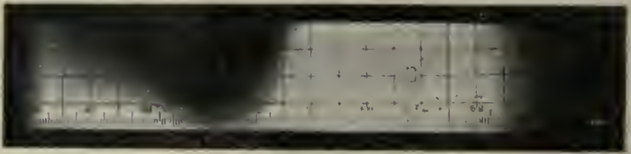
Auramine 0, 1 : 1,000.



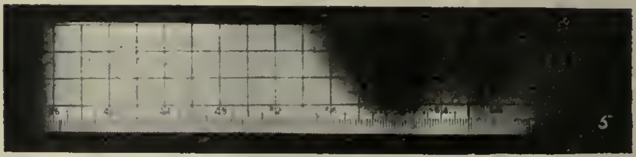
Filter Yellow A, 1 : 250.



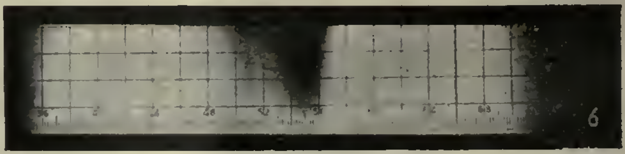
Naphthol Green B, 1 : 1,000.



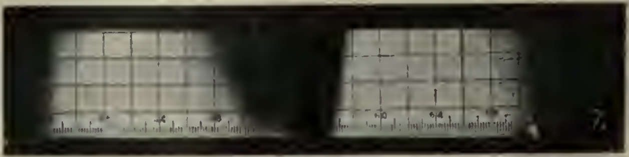
Mandarin Grange, 1 : 2,500.



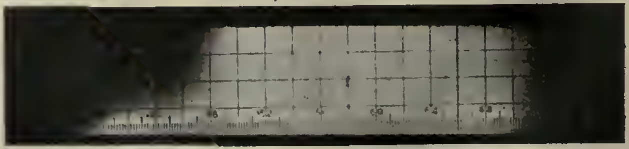
Methylene Blue, 1 : 2,500.



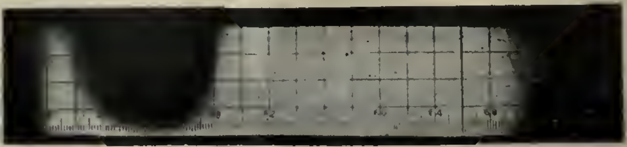
Rose Bengale, 1 : 2,500.



Rose Bengale, 1 : 1,000.



P—Nitroso-dimethyl-aniline hydrochloride, 1 : 1,000.



P—Nitroso-dimethyl-aniline (base), 1 : 2,500.

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A SPECULATION ON CATHODE RAYS IN COLOUR PHOTOGRAPHY.

[The attractions of the direct method of producing colour photographs, as embodied in the bleach-out process, is the subject of the following note in "Photo-Era" by Mr. Robert Thorn Haines, an Australian experimenter, by whom, it will be remembered, a paper on a duplex system of cinematography was read some years ago at the Royal Photographic Society. While we do not share the author's hopeful view of a colour process dependent upon the bleaching action of light upon dyes, it is worth while to draw attention to his suggestion as to the possibility of using coloured compounds produced by the action of cathode rays in a colour process of this description.—Eds. "Colour Photography" Supplement.]

A TRUE photograph in natural colours is one wherein the various objects transmit to the eye coloured rays of exactly the same tint as the rays transmitted from the objects themselves, and it means a photograph in colours true to nature produced by the direct action of light on substances. In order to produce such a photograph it is necessary to employ a sensitive substance which, on exposure to coloured light, will yield a product possessing the colour of the light falling upon it. If a substance could be found which would yield all the colours, it would seem possible to produce the various tints of the objects by the action of light on that substance, whatever it might be.

Objects appear coloured because they transmit to the eyes coloured rays of light, and they will not appear coloured unless they reflect light which has fallen upon them. Although, until now, no single substance has been found which would yield all the colours and tints of nature, it is conceivable that the admixture of different substances in combination, each yielding a portion of the colours, may serve to produce the desired photographic result.

The action of sunlight in altering or destroying the colours of material was first observed at a very early date, and the precise nature of that action has since been fully investigated, and is now thoroughly understood. Coloured light seeks to destroy complementary colours, while it retains those similar to its own. Here we have a theoretically sound fundamental law, which if properly applied in conjunction with suitable materials should produce satisfactory results. Since all the colours in nature can be produced by the admixture of three of suitable tints, it is apparent that if pigments of the correct shade be employed, and allowed to be acted upon by the coloured light from the objects, each colour could be made to destroy its complementary colour and retain its own, resulting in a picture faithfully reproducing all the objects in their true natural tints.

A considerable amount of work has been done by a number of investigators, including the author, in the endeavour to ascertain or determine the precise action of light on dyes of various qualities and shades, as well as in the effort to produce satisfactory photographs in natural colours by their use on that principle; but beyond obtaining encouraging indications that success will follow ultimately, when certain difficulties are overcome, no thoroughly satisfactory photograph appears to have been produced by that method.

Although so much has been discovered respecting the character, behaviour, and fitness of very many dyes and chemical substances proposed to be used as sensitising- and fixing-agents, it still remains to determine by experiment which of those are most suitable, and the best way to employ them.

There is a bewildering variety of dyes to select from, many of which, under special treatment, have yielded fair results. There is also a large number of chemical substances known to be more or less suitable to sensitise the dyes and render them more fugitive under the influence of light, as well as others to increase their permanency in order to fix the picture when it is obtained. The prospect, therefore, of producing photographs in natural colours by such method is, indeed, very encouraging. Adopting similar principles without the use of dyes or pigments, there appear to be great possibilities in taking advantage of the peculiar phenomenon of the colouring of salts by cathode rays.

It is known that if cathode rays are allowed to fall on certain salts, vivid colours are produced in them. Different salts produce different colours, so that a variety may be so obtained. The colours so acquired in a small fraction of a second may be preserved for many years if the coloured substances are kept in the dark and at low temperatures, and it is conceivable that they ~~might be~~ made permanent by fixing. A salt if dissolved may produce very different colours according to the medium in which it has been dissolved, even when the pure medium itself cannot be coloured at all by the cathode rays. Very small admixtures are sufficient to produce intense colours. These salts are very sensitive to daylight, and even after an exposure of a few seconds to diffused light, the colouration diminishes. Longer exposure to the cathode rays renders them less sensitive to daylight, so that by sufficiently long exposure they become insensitive, and may be thus permanently fixed. If the law which holds that coloured light seeks to destroy complementary colours while it retains colours similar to its own is universal, and applicable to these salts, it would only be necessary to prepare a surface with three suitable colours, either mixed in solution or separated, and, after a short exposure in the camera, the coloured lights from the objects would destroy their complementary colours, and leave remaining on the surface a picture of the objects in the true colours of nature. To complete this picture, it would require only to be fixed by prolonged exposure to the cathode rays. From the positive thus obtained, a negative could be made from which any number of pictures may be produced.

This differs materially from all known methods of colour-photography, and being free of the objection that it is an ingenious makeshift, would form a true solution to the problem of how to produce photographs in their true natural colours by the direct action of light on substances.

Robert Thorn Haines.

ILLUMINATION OF THE SUBJECT IN DETERMINING THE COLOUR QUALITY OF AUTOCHROMES.

[In the following article, which is one from the "Photographic Journal of America," the author discusses the question of the cause of the superiority of Autochrome transparencies when the exposures are made in a strong light. While one can agree with the physical basis of his explanation, it still remains to be borne in mind that quality in an Autochrome transparency, as in that of any other photograph, is greatly a matter of taste. "Superiority" is often construed in terms of a preconceived standard of what a colour transparency should be like—that is to say, of the maximum degree of brilliancy. Nevertheless, the artist whose eye is trained to observe natural effects under weaker conditions of illumination will appreciate the "quality" of colour transparencies which render such effects; and there is no ground for denying that the Autochrome responds to subjects of this character as perfectly as it does to the gayer hues of brightly sunlit landscapes. —Eds. "B.J."]

Every Autochromist soon learns that a good, full light during the exposure conduces to the most colourful results. Moreover, he is not long in finding that it is better to choose what a black-and-white photographer would call a "flat" lighting, that in fact entirely successful pictures may be taken with the camera directed away from the sun. One reason for this is that the differences of colour in a colour-photograph lend it that necessary variety which in an ordinary photograph is given by differences in shade. But a more special reason for avoiding deep masses of shade when taking colour-photographs is that they turn up both darker and duller in the resulting positive than they were in the original, if development is stopped just when the high-lights are fully brought out. By this lack of brightness and colour they set the lighter parts of the picture into too great prominence, or, stated in another way, cause too much contrast. In great measure this over-darkness of the shadowy portions of brightly lit pictures is due to a lack of latitude in colour plates, and in lesser degree to other phenomena that will not be gone into.

But there is also an apparent want of proper colour in pictures taken on dull days when the illumination is perfectly even, and which a lack of latitude in the plate would not account for. The uniform experience of workers along these lines is that a decidedly more brilliant colour-record may be obtained from a brightly lighted subject than from the same subject under a comparatively poor light, although in the second instance the plate has received a full exposure. This apparent fault has been commonly attributed to some individual peculiarity of the plate. My purpose is to show that very largely it is due to an altogether different cause.

Probably most of us who saw aniline dyes in bulk for the first time were surprised to find that many of them in this solid form appeared nearly or absolutely without colour—quite black—but on being dissolved and spread out on paper they exhibited a most intense coloration. A more familiar example is found in the cakes or pans of water-colour used by artists. Mauve, for instance, in a wash of the proper depth is an extremely powerful pigment, but in the pan it is so dark that it would be difficult for one to tell at a little distance what its true colour really is. On the other hand, some pigments like vermilion (mercuric sulphide) and a number of the yellows appear just about the same in bulk as they do on paper. The natural question is, What causes this peculiar behaviour of colours?

The answer will, of course, be familiar to most of my readers. The "black" pigments do not of themselves reflect light appreciably, and show up only by light which passes through them. If they are spread thinly on white paper the light goes through the layer of colour to the paper, is reflected, and penetrates again through the colour to the outside, and in this double passage all the colours except that one transmitted by this particular pigment are filtered out, and so the emerging light, and therefore the pigment, appears brightly coloured. However, if this pigment is in bulk, or if it covers the paper to too great a depth, but very little of the light that strikes it comes back; nearly all is absorbed, and so naturally the substance appears without colour, or black. But those colours which appear of their natural tint, regardless of what quantity may be aggregated together, reflect light of themselves without additional help. Their molecular structure is such that they send back light of a certain refrangibility and absorb all the rest, and hence appear of a definite hue. For this reason they require no backing, and, in fact, are often quite opaque, so that light penetrates them only to a very small distance indeed.

Now all of this has a direct bearing on our subject, because both of these classes of pigments are found in nature. The colouring matter of living things is generally of the first—transparent—variety; whereas of minerals it is as a rule of the second or opaque kind. Plants, for instance, have green chlorophyll in their leaves, and the earth and many rocks are stained red by salts of iron. In nature, however, we rarely find pigments spread over an intensely white reflective surface, like the colours are spread over paper by a painter. They are diffused throughout the substance which they colour, a substance that is only imperfectly reflective in any of its parts. Hence the light that is reflected from them comes from various depths within the living structure—some from near the surface, some from further in the interior of the leaf stem, or whatnot, that is reflecting the light.

Observe the conditions closely. That light which comes from the surface of the object will be less saturated with colour than the part which comes from the interior, since it will have passed through a lesser thickness or quantity of pigment. So then on a dull day, when the light is of sufficient strength to penetrate only a minimum distance into the object, it emerges with a smaller burden of colour than on days when the light is bright, penetrates deep down into the partly reflecting substance, traverses a thick layer of colouring matter, and comes out more completely charged with colour. Even the comparatively opaque colouring substances, because they are not *entirely* opaque, behave to some degree in the same way. Therefore, on bright days the colours that usually occur in nature are not only more intense or brilliant, but are also as a rule *actually more pure or saturated* than on dull days. We notice the one without perceiving the other. We see the livening of the landscape under an increasing sun, but unconsciously attribute it altogether to the augmented light, forgetting the rôle that colour plays in causing the transformation. We do not separate the qualities of light and colour in judging either the well-lit scene or the one under an overcast sky, but the colour-plate records these colours closely as they are: proper exposure eliminates the difference of brightness that existed in the originals, and consequently the two plates show marked differences of colour, notwithstanding they are equally transparent, and we, not recognising the facts, attribute it all to some eccentricity in the plate.

I suppose the reason that this explanation does not at once occur to a person, or that he is reluctant to accept it, is because he does not ordinarily see two widely distinct aspects of nature in juxtaposition, as they are presented by two such colour-photographs, but sees them at different times, and his memory does not serve him well enough to lead him to the truth. Generally alterations of lighting take place so gradually in the processes of nature that the changes of colour that go with them entirely escape us. However, there are certain times when we do notice these changes of colour, which happen more especially when a rather abrupt difference of lighting occurs. For instance, if one observes a landscape partly obscured by the shadow that falls from a cloud, he will notice that the difference in the actual amount of colour perceivable in the shaded and sunlit area is very considerable. One will often remark a similar effect in his room, as it is suddenly lighted up by the passage of a cloud from over the face of the sun. Dark furniture and picture-frames, which were previously of a gloomy monotone, now show beautiful variations of tint in their graining, and the colour of one's rugs and books comes out splendidly. If our eyes are prepared for it they will often pick out examples in nature that illustrate the point. Some morning glories are of so dark a tone that in shadow they appear black, but in direct sunlight show up a deep and beautiful blue. Both reflection and observation, therefore, go to show that the disparity in the purity of colours noticeable in colour photographs of the same subject taken in widely different intensities of light represent pretty nearly what is actually the fact, and are due to no inherent and obscure fault in the plate at all.

From the foregoing it follows, and I doubt not that the experience of Autochromists will bear me out in my conclusion, that there are certain cases in which a reasonable difference in illumination can result in no defect of colour rendering whatsoever. A gaily coloured painting, for instance, should photograph well in almost any light. Likewise any object which light, be it never so dull, completely penetrates, such as colours in solution, or, using an example nearer to nature, the petals of most flowers, certain leaves, etc., should photograph equally well when poorly as when brightly illuminated. One of the very best flower pictures I ever secured was taken indoors in the early spring with a heavy, overcast sky. The exposure was five minutes at $f/8$, but the colours of the resulting diapositive were all that could be wished for. On the other hand, it is just as apparent that certain dark, dull-coloured objects demand all the light that one can get on them, because their true glow of colour does not appear by mere surface reflection: the light must be made to penetrate into them to bring their latent colour to the surface.

An acquaintance with these facts should serve as a guide when making exposures under uncertain conditions of lighting, and, of course, as in all questions where design or composition enter, the correct procedure will be determined very largely by what is paramount in the picture. Where the greater part or the most essential part of the scene contains colours that are dull, lifeless, and what an artist would call non-luminous or degraded, as would apply in photographing a quarry, a gray stone building, or the interior of a sombrely furnished room, it would be better to wait until the illumination is at its best to expose an Autochrome. But when one is photographing in the flower garden, or making pictures of blond faces accompanied by pink-and-white dresses—when only the brown bark of shrubbery or a deep-hued ribbon will fail to register properly—it would be perfectly feasible to take the picture despite an indifferent light, because then everything that is of importance will show its colour faithfully in the resulting picture.

As a closing remark it would be well to state that I do not wish to imply that dulness in pictures taken on cloudy days is in all cases, or in particular cases, altogether due to the cause which I have tried to bring out. It may be the result partly of inexperience, partly of various influences which operate to a greater or less degree under different conditions, and which it would take too long to discuss. My contention is that a seeming dulness in Autochromes taken under a poor light, when the plate has been perfectly exposed and carefully manipulated, is very largely due to the fact that the colours in the scene itself have been smothered by an inadequate illumination.

Noel Deisch, B.A.

DECENNIA PRACTICA—COLOUR PHOTOGRAPHY.

PROCESSES OF MAKING COLOUR SCREEN-PLATES.

In regard to these extracts from the "Almanacs" of the years 1906 to 1915, processes relating to the Autochrome and Paget screen-plate colour processes will not be found among them, since they appeared in a previous instalment, namely, that in the "Colour Supplement" of August 3, 1917. The processes here dealt with have been arranged in alphabetical order of the patentees' names in those cases where several patents stand in the name of a single experimenter. The single patents which now follow are grouped in a class by themselves.

Patents of Agfa, Berton and Gambs, Duncan, Du Hauron, Lehner, Lumiere, Mees and Wratten, Obergassner, Rothgiesser, and Sanger Shepherd.

Colour Screen-Plates by Emulsion Method.—A further patent in reference to the manufacture of mosaic screen-plates by this method has been taken out by the Aktien Gesellschaft für Anilin Fabrikation. It is No. 9,167, 1912, and supplements Patents Nos. 16,273, 1910, and 6,279, 1911. Coloured solutions of colloids are scattered or sprayed by a current of gas, and the fine drops thus produced are suspended while still in the liquid state in a liquid in which they are insoluble; for instance, suitably coloured aqueous solutions of gelatine or dextrine are sprayed by means of a current of air through a nozzle, the air being preferably saturated with water vapour. The falling drops are suspended in oil of turpentine, obtaining thus an emulsion, e.g., of red drops, which, after mixing it with a corresponding emulsion, e.g., of green and of blue drops, is brought upon a sticky layer spread over a glass plate or film. The colour screen thus obtained is covered with an impermeable varnish, whereupon the screen may be covered with a photographic emulsion.—"B.J.," May 9, 1913, p. 367.

Fabric Screen-Plates.—Rodolphe Berton and Joseph Gambs patented a method of producing screen-plates by means of a fabric of transparent filaments, to which is applied the sensitive emulsion. In making the fabric there is used as weft and warp alternate filaments of each of the three colours, or, as weft and warp alternately, a filament of each of the three colours, leaving the filaments of opposite direction (warp or weft) in white or non-coloured silk; or a fabric may be used the warp of which is dyed with one of the three colours, the weft with a second of such colours, and the interstices thereof filled with a coloured material making the third colour. The filling of the interstices and consequently the production of the third colour of the net may be obtained either by means of a coloured powder or preferably by using a suitable coloured gelatine or varnish.

In practice the coloured filaments on leaving the spools and after sufficient drying are placed on slightly conical rollers, which, by rotating and sliding the threads along the generating line, bring them into contact. The contact is made more perfect by moistening the filaments with a viscous liquid, such as glycerine or dissolved gum arabic, and by causing them to travel over a polished cylinder, the tangential velocity of which is slightly greater than the velocity of the filaments. Capillarity then ensures immediate contact without overlapping.

Seen with the naked eye, the resultant film appears absolutely neutral if the pigments are properly selected, but under the microscope the fine striæ in three colours are visible. This film forms a perfect selective filter.

The fabric preferably used is very close muslin, dyed in the usual manner with a very fast mordant, and of rather dark colour. If necessary the fabric may be sized to prevent the adherence of foreign substances to the silk during the subsequent treatment.

If it is necessary to fill the interstices of the fabric with a pulverised substance, the filling is effected after the fabric has been applied to the glass and before the caoutchouc layer has become quite dry. A soft rotary brush can be used to remove the superfluous powder.

If the interstices are filled with gelatine or with a coloured solution containing a ferric, chromic, or other sensitiser, which gives a coloured reaction under the influence of light, the third colour is obtained by the photographic exposure through the screen, the threads of the fabric protecting the gelatine directly behind them.

The screen is varnished when dry, either with wet or with pulverised varnish, and the emulsion is applied when the varnish is dry. —Eng. Pat. No. 20,834, 1906. "B.J.," August 9, 1907, p. 603.

Mosaic Screen-Plates.—F. Martin Duncan prepares a grain screen-plate, the elements of which are composed of particles of gum-resins, such as tragacanth and other gums containing calcium salt of bassorin.

The support of glass or celluloid is first coated with gelatine, then with a transparent varnish, for example, a solution of dammar 115 gms. in benzole 1,000 c.c.s., or with a thin layer of glycerine. Upon this coating, while still moist and slightly adhesive, the stained particles of the gum-resin are applied, and the plate is then given a protective coating of a waterproof transparent varnish composed of

Shellac solution, 20 per cent.	160 c.c.s.
Ammonia, 0·880	30 c.c.s.
Methylated spirit	320 c.c.s.

On this the sensitive emulsion is coated.

In another method of preparing the colour screen a coating is given of a solution of fish-glue in water containing also ammonium bichromate, sugar, albumen (of one egg), and gum-dragon. After drying the plate is exposed behind a key-plate formed by two ruled gratings placed one on the other at an angle so as to form diamond or lozenge-shaped openings. After exposure to light the sensitive plate is developed in hot water, and the remaining image stained with one dye, which is fixed by a mordant. A second coating of the fish-glue mixture is given, and the dried plate registered under the key-plate, so that the opaque lines on the latter cover the stained portion of the sensitive plate. A second exposure is given, followed by staining with a second dye, and, finally, a third coating of the fish-glue mixture is exposed through the coated plate itself, so that the whole surface of the latter, after staining with a third dye, is completely filled with the colour elements.—Eng. Pat. No. 50, 1909; "B.J.," Jan. 28, 1910, p. 69.

Du Hauron's Process.—According to the patent of Du Hauron and De Bercegol, the method employed in preparing a colour screen-plate (the "Omnicolore") is to rule a gelatine-coated surface in a set of lines of one colour in transparent greasy ink, another set in another colour, and finally to stain the whole plate with a water solution of the third colour, so that the screen is automatically and completely filled by the colours. The patent describes various methods of applying this principle in making the plates.—Eng. Pat. No. 194, 1907. "B.J.," Sept. 13, 1907, p. 696.

Colouring Celluloid for Mosaic Screen-Plates.—F. Lehner employs dyes soluble in water, but not in spirit, by rolling or kneading the celluloid with spirit containing as much water as possible, and adding the colours solid or in solution. The water thus serves as a carrier of the colours, which, but for its use, are insoluble in the celluloid. The dyed mass of celluloid, when rendered homogeneous, is partly deprived of its water by heating after the last addition of colour, and is then formed into films. The last portions of water are removed by drying the films for several days. The hardness of the films, caused by protracted drying, is remedied by exposure to vapours of strong spirit or absolute alcohol. Dyes soluble in water, though with difficulty soluble in spirit, are stated to be as follows:—For red, Ponceau F. R. (Casella and Co., Frankfort-on-Main), or Ponceau 4R (Hoechst). For blue, "silk blue" (Seidenblau R. of Casella and Co.), or "cotton light blue" (Baumwolllichtblau, Hoechst). For green, concentrated acid green (Säuregrün conzentriert D, Hoechst) or Naphthol green (Naphtholgrün B, Casella). For yellow Naphthol yellow (Naptholgelb S, Badische Anilin u. Sodafabrik, Ludwigshafen), or "Acid yellow" (Echtgelb G, of the same firm).—Eng. Pat. No. 7,629, 1908; "B.J.," Jan. 16, 1909, p. 49.

Lumière Geometrical Screen-Plate.—According to a French patent taken out by the Lumière Bros., the following process is used for the making of a screen-plate of regular geometrical design:—

(1) Two thirds of the surface of the plate is covered with a greasy ink, which serves only as a temporary resist, and may therefore be of any colour. This application can be made in the form of lines, points, or grains. Fig. 1 shows this first ink coating in the form of equidistant lines *a a*, indicated by cross hatching.

(2) The portion of the surface not protected by the lines is dyed with a suitable solution of colouring matter, violet, for instance.

(3) The whole surface is then varnished with a preparation which must fulfil the two following conditions:—(a) The solvent employed in making it must not dissolve the greasy ink before mentioned. (b) The resin or other substance which forms the basis of the varnish must be insoluble in liquids which dissolve the greasy ink—that is to say, if the ink employed contains linseed oil, and the varnish is made of resin previously extracted by ether and dissolved in alcohol, the solvent of the varnish, alcohol, will not dissolve the greasy ink, and after it has evaporated will leave the whole surface covered with a thin film of resin. This film, in the parts where it is in contact with the greasy ink, tends to mix with the latter on gentle heating.

If the plate is next treated with a solvent of the ink in which the varnish base itself is insoluble—that is to say, with sulphuric ether —a slight friction will remove all the ink as well as the resin which covers it, and will leave on the surface of the plate only the resinous lines covering the parts which have been dyed violet. The structure of the plate at this stage is shown in Fig. 1, where *w w* represents the series of violet lines covered with varnish, and *a a a* the portions of the unaltered plate from which the ink has been removed.

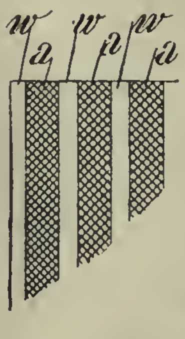

Fig. 1.

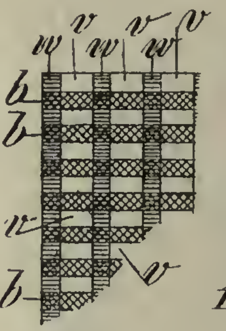

Fig. 2.

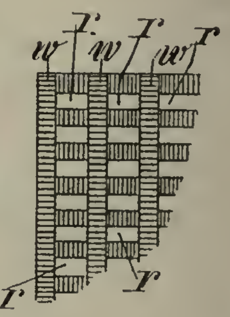

Fig. 3.

(4) A second application of ink is now made over half the total surface, say, in the form of the horizontal lines *b* shown in Fig. 2, or in any other way. The plate is then stained green, this dye in the present case being absorbed in the rectangular spaces marked *v v v*, being prevented from reaching any other part of the plate by the lines of ink on the one hand and the lines of varnish on the other.

(5) The whole surface is again varnished, the solvent again applied, and the ink removed as already described in (3). We then have, as shown in Fig. 3, one-third of the surface coloured violet indicated by the horizontal hatching, and another third coloured green as indicated by the vertical hatching, the remaining third of the area of the plate being uncovered. The coloured surface being protected by a varnish, the whole plate can now be dyed in the red colouring matter, and it is then complete.

(6) The whole surface of the plate is then washed by means of a solvent of the varnished base, such as alcohol, and a protective film of rubber then applied in order to prepare the plate for the application of the sensitive emulsion.

In short, the invention consists in a process of preparing polychromatic screens for direct colour photography as follows:—Each successive fraction of the surface of the screen is dyed with a different colour, whilst the rest of the surface is protected partly by an application of ink and partly by a varnish covering the colour or colours previously applied. This varnishing is rendered possible by the choice of the constituents of the varnish, which must be such that the solvent of the resin employed does not dissolve the ink, whilst the resin is insoluble in a solvent of this ink.—"B.J." (Colour Supplement), Aug. 7, 1908, p. 57.

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THE RESOLUTION OF MIXED COLOURS BY DIFFERENTIAL VISUAL DIFFUSIVITY.

(A paper communicated to the "Philosophical Magazine.")

UNDER the title "Visual Diffusivity" the writer described some time ago[1] experiments on the lagging of different colour impressions relatively to each other.[2] These were predicted on the basis of a theory developed to explain the behaviour of the flicker photometer. An essential part of this theory was the ascription to each colour impression of a characteristic rate of transmission along the visual channel. In developing the theory it was assumed that each colour acted quite independently.

In two instances it appeared necessary to modify this last assumption. One was the case of alternated colours exposed for unequal lengths of time. Here the flicker-photometer theory apparently called for much greater effects of dissymmetry than experiment showed. The other was the failure of an attempt to resolve a purple into its constituents by moving it across the field of view. It was concluded in the light of these experiments that some mutual action of colours in the act of transmission must take place.

Later work on the flicker-photometer theory showed that when the complete equations were employed, dispensing with the earlier assumption that the effect of varying speed could be neglected, the case of unequal exposures did not require the assumption that the individual colours affect each other in transmission. There remained then to be explained the failure to resolve purple in the manner described. In view of the very satisfactory quantitative success of the flicker-photometer theory as demonstrated by the more recent work with the polarisation design, it appeared highly desirable to go more fully into the question of visual diffusivity with mixed colours. The outcome of this further study has been to establish the experimental conditions pre-requisite to the detection of the resolution of mixed colours by the different visual diffusivity of the components. With the proper conditions, not only has it been possible to resolve purple into red and blue, but observations have been made on both monochromatic and compound yellows, with results of interest in colour-vision theory.

Experimental Procedure.

In making the experiments recorded in the paper on "Visual Diffusivity," full use was made of the fact that the eye is very sensitive to a break in the continuity of a straight line. The two coloured strips under observation were set slightly out of line, and then passed before the eye at a speed such that they appeared to form a continuous instead of a broken line. In attempting to resolve a purple into red and blue this peculiarity of the eye was not taken advantage of. A purple strip was moved across the visual field, and evidences of widening or duplication were looked for. To this the eye is much less sensitive.

On reconsidering the problem recently it was realised that the criterion of linear continuity should, if possible, be used to judge of a resolution of the kind expected. The arrangement of coloured areas finally decided upon was that of a continuous slit—red at one end, blue at the other, with purple in the middle, the purple being the mixture of the two end colours. This arrangement is shown in Fig. 1*a*. When this strip was moved across the field it was hoped that not only would the red and blue be displaced, in agreement with the previous experiments, but that it would be evident that the displacements overlapped, in the manner shown in Fig. 1*b*. That is, instead of looking for the duplicity of the portion *p*, which could not be detected previously, attention would be directed to a possible widening which would continue the straight line of both parts, *r* and *b*.

The production of such an overlapping red and blue strip, which could be placed in the disc apparatus formerly used, was first attempted by photographs on an Autochrome plate, but the purity of the resultant colours was not satisfactory. The final apparatus used was a simple colour-projection scheme, the requisite motion of the colour patches being provided for by the movement of a mirror before the eye. A plan of it is shown in Fig. 2, where *a* is a box containing two point-source tungsten lamps, controlled by separate resistances *b*. The light from these lamps passes through diaphragms c and coloured glasses *d* to the matt white screen *e*, which is viewed through the slit *f* by the eye at *h*, after beng reflected from the mirror *g*, arranged to rotate about a vertical axis. At *j* are movable screens of short vertical length, which can be so placed that either top or bottom of the screen *e* is illuminated by one colour of light alone. With this arrangement it is possible to have the slit *f* appear of either colour given by the glasses at *d*, half of one colour and half of the other, or else part of one colour, part of the other colour, and part of the two, as in Fig. 1*a*.

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[1] "Visual Diffusivity," Ives, Phil. Mag. Jan. 1917, p. 18.

[2] "Theory of the Flicker Photometer," Ives and Kingsbury, Phil. Mag. Nov. 1914, p. 708, and April 1916, p. 290. "A Polarization Flicker Photometer and some Data of Theoretical Bearing obtained with It," Ives, Phil. Mag. April 1917, p. 360. "Hue Difference and Flicker Photometer Speed," Ives, Phil. Mag., August, 1917, p. 99.

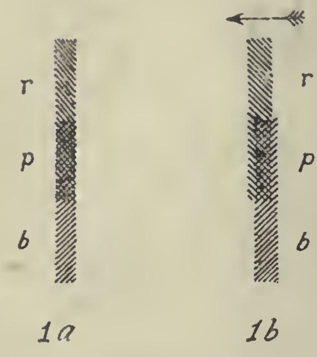

Fig. 1.

1a. Stationary slit coloured red (*r*) at one end, blue (*b*) at the other, and the purple formed by their mixture (*p*) in the middle.
1b. Appearance of slit when in motion in the direction of the arrow.

Results with Purple Light.

Four possible behaviours of the purple mixture region of the strip shown in Fig. 1*a* may be imagined. On lateral movement either (1) the purple may move bodily as the red constituent, or (2) as the blue constituent, or (3) it may exhibit an intermediate shift, or (4) it may spread out into red and blue. Either (1), (2), or (3) would be possible interpretations of the previous trial.

On making the experiment with the new arrangement it was found that the appearance presented was unmistakably that of Fig. 1*b*—that is, *the mixed colour, when passed across the field of vision, was resolved into its components, just as it would have been if viewed through a weak prism.* By careful adjustment of the intensities the effect was made so clear-cut as to be immediately apparent, and was verified by a number of observers. This effect is shown very strikingly if the slit image is oscillated by the proper mirror movement. In this case the two colours appear to slide over each other at their overlapping portions. The appearance here is as though a purple slit of moderate length were viewed through a prism set with its edge at right-angles to the direction of the slit, and then rotated back and forth with the line of sight as an axis.

It appears from this that we have here *a new method of colour analysis*, dependent on the properties of the eye and not on those of an inanimate physical instrument. It is of interest to apply this new method to other mixed colours—in particular to yellow.

Results with Monochromatic and Compound Yellow.

Yellow is of peculiar interest in the study of colour vision because the same sensation may be produced in two different ways. One is by the pure yellow of the spectrum, the other is by the mixture of red and green light. Unlike the blue-green of the spectrum, which may be matched similarly by a mixture of the colours to either side, yellow gives a sensation totally distinct in character from its components. So definitely is this so that the psychological elementary colours, not recognisable as mixtures, are red, *yellow*, green, and blue. MacDougall, Schenck, and others consider it probable that the red and green sensations have been developed from a more primitive yellow sensation, the latter one of the two sensations (warm and cold), into which primitive monochromatic vision first separated.

Trial by this new method (provided it proved sensitive enough to give definite results) offered the possibility of answering the following questions, suggested by the nature of yellow light, as just discussed:—

(1) Does a mixed yellow become resolved into its constituent red and green?

(2) Does a pure yellow become resolved into a red and a green?

If the answer to both these questions is affirmative, it might be interpreted as meaning that the action of both kinds of yellow light is to break down two substances, red and green, at the surface of incidence, which then travel back at different speeds to a point where the double product either combines into a yellow substance or is interpreted as yellow.

If the answer to both these questions is negative, it might be interpreted as meaning that either kind of yellow light breaks down a yellow substance, which travels back with its own individual velocity, i.e., that colour fusion takes place at the surface of incidence. A third possible answer—namely, that the mixed colour is resolved and the pure is not—might be interpreted to mean that distinct red, yellow, and green substances are broken down by the light, travel back with their appropriate velocities, and that red and green fusion occurs after this transmission. The answer to these questions can be obtained only by experiment.

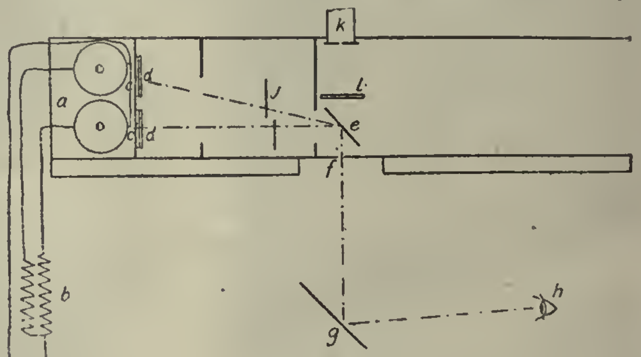

Fig. 2.

Arrangement of apparatus:—*a*, box containing two point-source tungsten lamps; *b*, resistance for controlling current through lamp; *c c*, diaphragms; *d d*, coloured glasses; *e*, matt white surface; *f*, slit; *g*, mirror; *h*, observer's eye; *j*, moveable screens of short vertical length; *k*, monochromatic illuminator; *l*, opal glass.

For the yellow light tests the apparatus as above described was provided with red and green glasses of narrow spectral transmissions for the mixed yellow, and a monochromatic illuminator, *k*, was added, illuminating an opal glass, *l*, which could be viewed through an opening in the screen *e*. By this means either red light or green light or their mixture, or a monochromatic yellow matching the mixed yellow may be obtained, disposed in any desired way along the slit *f*.

The slit was first arranged to show half red and half green, and the intensities adjusted until on movement of the mirror the lag of green behind red was well shown. This occurs at a rather low intensity, and care must be taken to have absolutely no stray light in the room. (In these experiments the slit *f* was placed over a hole in a door between two rooms, so that an assistant could make the necessary manipulations, without any stray light reaching the observer.) When this condition was found the screens *j* were placed so that the middle of the slit showed the compound yellow. *This compound yellow was clearly resolved* by lateral motion across the field of view. In fact, the resolution was even more satisfactory than it had been with purple, because the two edges of the centre patch were seen on several occasions to be red and green. This greater success is probably due to the very distinct difference in appearance between yellow and its constituents.

The next point taken up was the behaviour of the pure yellow, adjusted to be a subjective match with the compound yellow, and arranged to take its place exactly between the red and green. It was at once apparent that *pure yellow does not separate into red and green*. This fact is strikingly shown by arranging the slit so as to be all compound yellow, except a small portion of pure yellow. When stationary the slit appears alike throughout its whole length in brightness, hue, and definition. But upon moving the image sideways, or oscillating it, the compound yellow immediately broadens out and becomes ill-defined, the pure yellow remaining narrow and sharp. The appearance is identical with that produced by a weak prism, and again demonstrates that this phenomenon provides a new, if rough, method of spectrum analysis.

Discussion.

The results obtained with purple light are of chief interest as justifying the assumption made in the flicker-photometer theory, that each colour is transmitted with its own characteristic speed, irrespective of whether it occurs alone or with other colours. The results from the yellow-light experiments are, however, of great interest from the standpoint of theories of colour vision.

If we consider these experiments without reference to any other work on colour vision it is evident that the explanation called for is one in which wave-length composition rather than appearance or colour-sensation analysis determines behaviour. Recently Houston has suggested a theory of colour vision according to which colours do maintain their physical wave-length identity in transmission to the brain. He supposes the spectral colours cause retinal vibrators "to set up waves in the nerves and that the nerves carry these waves to the brain," the dominant wave-length of the transmitted disturbance being that of the incident light. The results of the present paper might be interpreted as supporting this theory. A place at which the new phenomena might at first sight appear to fit into Houston's theory may be noted as suggestive. If the writer understands the theory correctly, it calls for the production of *fluorescence* at the retina, which illuminates the brain through the *transparent* nerves (for the "waves in the nerves" must, because of their frequency, be light-waves). Now it is one of the elementary facts of physical optics that a reduced rate of transmission of light-waves occurs in a medium of high refractive index, and that a different rate of transmission of colours, in the order of wave-length, occurs in a medium possessing, as most transparent media do, an absorption-band in the ultra-violet. Thus the velocity of light in carbon bisulphide is less than in air, and red light travels faster than blue. If, then, to the transparent nerves, which appear to be a part of Houston's theory, we ascribe a high refractive index varying in the usual manner through the spectrum, we have a system which would give the differential speed effects found by the present experiments. Unfortunately, the necessary refractive index to reduce the speed of light to the order of magnitude such that even a hundredth of a second lag of blue light would be possible in any distance available in the human head, is enormous and fantastic. Apart from this quantitative difficulty, the parallelism between the behaviour of light in the eye and in the highly dispersive medium is close. There is, however, no obvious explanation along this line of the variation of speed of transmission with the intensity of the stimulus.

HERBERT E. IVES, Ph.D.

(To be continued.)

DECENNIA PRACTICA—COLOUR PHOTOGRAPHY.

PROCESSES OF MAKING COLOUR SCREEN-PLATES.

In regard to these extracts from the "Almanacs" of the years 1906 to 1915, processes relating to the Autochrome and Paget screen-plate colour processes will not be found among them, since they appeared in a previous instalment, namely, that in the "Colour Supplement" of August 3, 1917. The processes here dealt with have been arranged in alphabetical order of the patentees' names in those cases where several patents stand in the name of a single experimenter. The single patents which now follow are grouped in a class by themselves.

PATENTS OF MEES AND WRATTEN, OBERGASSNER, ROTHGIESSER, AND SANGER-SHEPHERD.

Mees-Wratten Screen-Plate.—C. E. K. Mees and Wratten and Wainwright have patented a method of making a screen-plate from a grating by one printing only. The screen or grating from which they work is composed of lines, dots, etc., of three kinds—namely, black or opaque, semi-opaque, and clear. There is thus only one printing operation, the fixation of the three colours being obtained by differential staining. A glass plate is coated with a solution of gelatine, fish glue, albumen, or other colloid containing a strong solution of a blue dye—for example, patent blue. This film or coating is sensitised, say, by the addition of bichromate to the solution, or by the immersion of the plate in bichromate solution after coating. The plate thus coated is exposed to light, preferably daylight or the light of an electric arc, beneath a printing screen of graduated opacity, and conveniently consisting of a number of sets of lines, each set comprising a black or opaque line, a semi-opaque line, and a clear line. This printing screen may be made in any convenient way; for instance, by photographic means from a ruled screen which has black lines of twice the width of the clear spaces or lines, this ruled screen being printed in two operations with a shift equal to the width of one line between the two printing positions.

The exposures in these two printing operations are of different duration, to produce in one case a very dense or black line, and in the other a semi-opaque or grey line.

After printing beneath the screen of graduated opacity, the plate is washed until the blue dye is completely washed out of the lines which have been protected by the black lines in the printing screen, and partially washed out of the lines which have been partially protected. The result is that the coating bears a number of sets of lines, one of each set being strongly blue, another—the partially washed-out one—a blue-green, whilst the third is clear.

The plate is now soaked for a sufficient time in yellow dye of such a nature that it will soak only into soft gelatine, dyes of this description being well known. As a result, the blue line, which consists of hardened gelatine, remains blue, the blue-green partially soft line becomes pure green owing to the addition of the yellow, and the clear line becomes strongly yellow.

The plate is then soaked in a solution of a deep red dye, such as carmine. This dye penetrates only into the soft gelatine or yellow line, and turns it into scarlet. Thus the screen finally comprises sets of three lines in juxtaposition, the lines being respectively scarlet, green, and blue. The lines can, of course, be of any required fineness, the degree of fineness being governed by that of the original ruled screen.

On coating the colour-screen thus made with an emulsion which is rendered panchromatic, the plate can be used for direct photography in colours in the manner now well known.

Although it is preferred to commence operations with a film deeply stained with one of the colours, yet the invention may be carried out by performing all the staining operations after the printing of the sensitised colloid film. In such a case the first staining would be by a dye which only stains hard gelatine—for example, a chrome mordant dye. This would stain the fully exposed line and partially stain the medium line, but would wash completely out from the soft line. The two subsequent staining operations could be carried out in the manner previously described.

Again, by selecting suitable dyes, the staining operations may commence with a dye which stains only soft gelatine, and may end with one such as a chrome mordant dye that acts only upon the hard gelatine.—Eng. Pat. No. 28,406, 1907; "B.J.," July 31, 1908, p. 589.

Obergassner Convertible Colour Screen-Plates.—M. Obergassner has patented a screen-plate for colour photography in which the colour elements of the taking screen may be converted into their complementary colours by treatment with an acid or other means, and the process of producing a transparency simplified by thus dispensing with the operations of reversal.

These colours are, for example:

For red : 1 part litmus in 4 parts gelatine, red in acid solution, or blue in alkali solution.

For violet : 1 part metanile yellow in 4 parts gelatine, violet in acid solution or yellow in alkali solution.

For green : a mixture of :

1 part acid green,
1 part light green No. 1 and 2 solution,
½ part brilliant yellow,
3 parts phenolphthalein,
4 parts gelatine,

which is green in acid solution, and becomes red in an alkali.

The bath for transforming the aforesaid colours consists of about 5 per cent. sulphuric acid or 5 per cent. soda lye, or the like, as the case may be.

According to the nature of the colours the action should be continued for about 1 to 2 minutes until the colours have completely changed.—Eng. Pat. No. 1,549, 1912; "B.J.," Feb. 21, 1913, p. 145.

Rothgiesser's Line-Plate Process.—According to a German patent, No. 190,349 (sealed in 1906), granted to Georg Rothgiesser, of Berlin, a line screen-plate is fastened to a light-sensitive film or plate, and exposure made in the camera through the linear plate. The negative is then developed, fixed, and dried in the usual way. A second sensitive film is placed with its support in contact with the linear plate, so that the latter is between the negative and the second plate or film, and so that the surfaces of the two plates are outside. The second plate is now exposed, through the negative and the linear plate, to parallel rays of light. The transparency thus obtained is developed, fixed, and washed as usual, and the negative is then removed by any convenient means. The transparency to which the linear plate is now adhering shows the picture in its natural colours. The claim is for a process for making transparent colour photographs from negatives taken through a linear plate by immovably fastening a light-sensitive film to the linear plate of a negative, exposing the same, and then removing or destroying the negative so that the linear plate remains combined with the positive.—"B.J." Colour Supplement, Dec. 6, 1907, p. 94.

Sanger-Shepherd Screen Plate.—E. Sanger-Shepherd has patented the following process for preparing colour screen-plates without registration:—A series of lines covering one-third the area of the plate is first printed on the plate, say, by the fish-glue process, and a sensitive film applied over the surface thus coated.

Next, a series of, say, green lines is printed crossing the red lines at a suitable angle, using a negative in which the black and white lines are of equal width; instead, however, of placing the negative on or in contact with the coated side of the plate, we print through the glass or film so that the lines first printed form a portion of the negative, the result being that although the proportions of black to white in the negative used are equal, the printed area, owing to the interposition of the previously printed line, is only one-third of the total area of the plate.

After development the plate is re-coated and exposed to light through the glass, the red and green lines previously applied acting as the negative to cover two-thirds of the area, the remaining one-third being coloured blue.

In printing, the colouring matter may be incorporated in a fish-glue solution or the solution may be clear and the prints subsequently stained; in the latter case an insulating film of celluloid or other suitable varnish may be used.—Eng. Pat. No. 20,384, 1907; "B.J.," June 12, 1908, p. 459.

CHOICE IN COLOUR corresponds to the degree of sensitiveness and education possessed by the eye. The barbarian and the infant seize only the most striking notes in the colour-gamut. But as age, training, or civilisation advances, the individual appreciates the semitones, the quarter notes, perhaps even the finer divisions of the chromatic scale.—*The Craftsman.*

UVACHROMIE.—In a lecture at the Technical College, Munich, Dr. A. Traube (according to "Nature") read a paper on the production of coloured photographs by a process which he calls "Uvachromie." Three photographs are taken through suitable colour-filters, the negatives being copied on ordinary cinematograph films. After fixing, these films are treated in a bath so as to form a chemical compound that readily absorbs colour material. The three component pictures can be coloured and dried in about twenty minutes, and they are then placed in register upon one another, and the coloured photograph is complete. The new process has the advantage that as many copies may be made as are required, the process being rapid and simple. The photograph retains its sharpness of definition, and corrections in colour can easily be made by replacing one or other of the component films in the colour solution for the appropriate length of time.

SAFE LIGHT.—Now that we have plates which are at least as sensitive to green as to red light, it is necessary to be very cautious in the use of any illumination at all in the developing room. If tank development, which is preferable, is not adopted, a light tight box in which the developing dish may be placed should be provided. After inserting the plate the box may be occasionally rocked until development is complete, either red or white light being used to illuminate the dark room. The plate should be rinsed in the dark and left in the hypo for a minute or two before turning up the lights again. Many people cannot stand even five minutes in total darkness, and if a number of plates have to be developed the foregoing will be found a more cheerful way. Some workers use an ordinary candle behind a screen in a distant corner of the dark room, taking care to keep the plate covered as much as possible, and this seems as safe as the ordinary green filters with panchromatic emulsions.

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ON
Colour Photography.

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“WAR-TYPE.”

(Bromoil-Transfero-Collotype.)

The following method of printing was evolved with a view to obtaining prints from sets of three-colour negatives. It had to be worked out as a monochrome process, and seems as such to offer a cheap and workable method of making a number of impressions either in the original size of the negative or enlarged.

Mr Fred Judge has produced some very interesting three-colour results by the oil or bromoil transfer method, inking up the prints by brush, but I wished to avoid brushwork for the double reason that I have never acquired a satisfactory neatness in inking up prints, and that a truer colour rendering was probable if the tones of each print could be faithfully preserved. I therefore decided to use a roller and try for what the Bromoil pictorialist loftily terms a "mechanical" result.

I discovered, however, that the wet gelatine print curled itself lovingly round the roller, and could with difficulty be parted from it, so I looked about for some means of fixing the print to a rigid base. This I found in the Kodak Co.'s Transferotype paper. By the Transferotype process a print may be made in practically the same way as a Bromoil; the final print is not reversed, as in Bromoil transfer or collotype, and in three-colour printing register is facilitated. I will describe the method for three-colour, but its application as a monochrome process is obvious.

A set of Transferotype prints is made from the three-colour negatives at a single exposure, and preferably on a single sheet of paper, in one large frame, or it may be made in the enlarging lantern. For direct prints, an exposure of 3 seconds at 2 feet from an old obscured 8 c.p. Ediswan lamp has been found about right for a thin detailed negative, and 5 or 6 seconds for a somewhat dense veiled one. Over-printing must be avoided; the prints should be clean and detailed, the shadows not too black, and the high-lights free from veil. For colour-work it is useful to have a patch masked off on each plate to print in its own colour only. Most Bromoil workers seem to pin their faith to an amidol developer, and I have used the Kodak Co.'s formula with double the quantity of water, and sometimes with an additional drop or two of bromide. It will be found convenient to make prints from several sets of negatives at a sitting, and to dry them for use as required. They transfer better after drying, the film being less tender; they should be trimmed a little before transferring, as they expand slightly, but if all printed the same way of the paper they will register correctly.

Transferring to glass is a fairly simple process, the dried print being placed in water till limp, then squeegeed to glass with a roller squeegee, care being taken to eliminate all air-bells, and placed under pressure for forty-five minutes. It is then removed to a dish of hot water, and the paper backing peeled off, the Transferotype print remaining on the glass. If prints are transferred immediately after fixing and washing, water at 120° F. will do; but for dried prints it must be 170° F. Cooler water is apt to crinkle the film, and hotter water to melt it; adding hot water is also risky. It is essential to lave it thoroughly in the hot water at this stage, to remove all the soluble gelatine on the surface. It is then allowed to cool, rinsed for a few minutes in cold water, and set up to dry. The prescribed alum bath is omitted. Old negative glasses are suitable for transferring to, if thoroughly cleaned, dipped in a solution of 1 : 300 waterglass, and dried. Alternatively, a substratum of hardened gelatine may be used, but does not seem to have any advantage over the waterglass.

The next step is to put register marks on the plates. Most people have their pet devices for this, but a very simple way is to place a ruler across the length of the plate and rule off a short tick at either edge with waterproof ink and a fine pen. The same is done across the width of the plate, and a tick made across the line at the top of the plate to indicate the right way up. Each of the other plates is marked in turn, registering the images by holding two plates against the light and securing them with a clip while the marks are made. When a yellow print is pulled from the yellow printing plate, corresponding lines are ticked off with a pencil on the paper, and the red and blue images are easily brought into register by adjusting the inked plate with its register marks against those on the paper. It is as well to mark each plate with its printing colour. When the register marks are dry, the plates are bleached with Sinclair's or Williams' bleacher at the prescribed temperature, washed, and dried. Sinclair's bleacher gives good half-tones, but Williams' is perhaps more suitable if the blacks are at all heavily printed.

Finally, a safe-edge of shellac varnish (made by dissolving brown shellac in methylated spirit) is run round the edges of each plate to prevent the film from catching on the roller in printing, and the plates are then ready for "rolling up."

The yellow printing plate is soaked in water at 70°—80° F. for about 15 minutes. There does not seem any advantage in longer soaking. I fancy the thin film on the plate will only absorb a given quantity of water. Meanwhile the inking slab and roller—the former a clean sheet of glass and the latter a printer's composition roller—may be prepared. A little collotype ink, or Sinclair's oil-printing ink, or dry powder ink rubbed down with boiled linseed oil, is spread over the slab with a palette knife and rolled in all directions with the roller. The ink should be just stiff enough to cause the roller to cling slightly to the glass, and may be thinned if necessary with "lithographic varnish" or linseed oil; too much should not be spread on the glass at first. The plate is taken from the water and dabbed dry with an old soft handkerchief, laid face upwards on a flat surface, and rolled up with the inked roller. A card with an opening cut just a little larger than the plate will be found convenient to hold the plate steady while rolling up, and saves inking the fingers. Slow rolling puts on colour; rapid rolling cleans up the high lights. For pulling the proofs I use an office copying press, laying the plate down first (glass side down) on a thick sheet of card with a few folds of blotting paper on it, then placing the printing paper—which should be a little larger than the plate—on the inked surface, and covering this with a thick piece of felt (such as is used to deaden the noise of a typewriter). This sandwich is slid between the metal plates of the press and a rapid pressure given. The paper is now peeled off the plate, when the image will be found transferred to the paper. (In colour-printing, of course, the order should be reversed, and the plate laid down on the register marks.) As a rule, the plate will need re-soaking for a minute or two after a couple of prints have been pulled from it, but by working two plates at a time, one can soak while the other is being rolled up. If a gelatine substratum has been used, it is possible that the plate may retain more moisture. It may take a little time to establish a comfortable balance between the conditions of plate and ink, but it can usually be reached eventually. If the plate has a good deal of contrast, the ink may be very slightly thinned down with "varnish," and in this condition the ink is more readily taken up and any tendency of the paper to stick to the plate is avoided. The quality of such prints is very pleasing, but the high lights are slightly veiled. An over-printed image may occasionally be saved by prolonged soaking in warm water, and the use of thin ink. The best paper for printing is a thin smooth one; rough or thick papers do not pick up the ink evenly, and leave tiny white specks. "Art" papers leave a chalky deposit on the plates. Some papers pick up all the ink from the plate, whilst others leave a good deal in the shadows, a considerable drawback in judging the depth of colour when working in three colours. There is at present a restricted choice in white papers of any kind, but one may come across a suitable make of fairly good writing paper. Most papers work best when damp, but a few give blotchy prints when wetted.

The plate should finally be cleaned off with turpentine and a fluffless rag, the turpentine allowed to evaporate, and the plate washed for a couple of hours. The roller and slab are cleaned off with turpentine, and the hands in soap and water; a few drops of turpentine added to the last lather will be found a useful "tip." Turpentine is, unfortunately, now difficult to obtain.

Defects and difficulties—White spots on prints.—Usually caused by dust or specks of dry ink skin getting on to the plate or the roller, and, being forced into the film by the action of the roller, they form a core, round which a circle does not get inked up.

Dark patches on prints in parts which should be light. Possible causes appear to be uneven fixing, uneven bleaching, touching plate with a warm finger, use of alum bath after transferring.

Bars of unequal density are due to unequal squeegeeing, as when part of a print has been re-wetted to eliminate air-bells.

Transferotype film wrinkling or melting in patches. Due to the use of water at too low or too high a temperature in transferring.

Blisters.—These are a great trouble at times, but the best preventive is a substratum on the glass and careful squeegeeing. If a blister forms while rolling up, the plate should be washed and dried and a dab of shellac varnish used to cover the blister.

AGNES B. WARBURG.

THE RESOLUTION OF MIXED COLOURS BY DIFFERENTIAL VISUAL DIFFUSIVITY.

(A paper communicated to the "Philosophical Magazine.")

(*Continued from page* 35.)

Whether or not the visual diffusivity phenomena agree with the Houston theory, the latter requires, in the writer's opinion, much more support before it is profitable to attempt to harmonise new observations with it. The objections presented to it or any "wave-length" theory by the facts of colour mixture and colour blindness are very great. In particular the production of white by various pairs of complementaries of different centres of gravity, and the neutral points in the spectra of the two types of red-green blind, present serious difficulty of interpretation.

A great deal of evidence points to the probability of vision being a process of photo-chemical decomposition, in which either the decomposition products or electric currents set up by the process pass along the nerve tracks at the speeds characteristic of nerve impulses. Apart from the facts of colour mixture and colour blindness there is no reason why the number of separate decomposable retinal substances should not be very large. There is nothing in the present experimental work to indicate that the number is restricted to the red, yellow, green, and blue experimented with, although the method is so crude as a means of spectrum analysis that it would be difficult to show conclusively that a much greater number of speeds of transmission than four are exhibited in the length of the visible spectrum. As the method stands, it is inferior as a means of colour analysis to the single prism and wide slit first employed to exhibit the spectrum. For an answer to the question of how many reacting substances of different velocities of transmission exist, the resolving power should be more nearly that required to show the Fraunhofer lines. What is required to effect an improvement comparable with the instrumental advance quoted is some drug which will slow down the rate of transmission of the visual impressions, or the "time machine" of Mr. H. G. Wells.

Actually the mixture phenomena point to the existence of three, and only three, such reacting substances—a red, a green, and a blue. The question of paramount interest, then, is how can the different behaviour of the spectrally pure yellow and its subjectively equivalent mixed yellow be harmonised with three-colour theory? It is evident that the "three different types of nerve fibre" postulated by Young, or the "three different, independent, and mutually unopposed elementary activities" in the statement of the theory by Helmholtz, must be located (if existent) at some distance along the conducting path between receiving surface and brain. By this new method of analysis we can actually see red and green being transmitted a certain distance at different speeds[3] before combining to make yellow, and we can see yellow being similarly transmitted, as yellow. Red and green light acting together do not cause a yellow reaction or the breaking down of a "yellow substance" at the surface of incidence. Neither does yellow light cause at this surface the breaking down of a red substance and a green substance. *If a trichromatic mechanism is necessary, as it appears to be from the phenomena of colour mixture and colour blindness, then the present experiments call for the additional complication of an antecedent transmitting process where colours retain their physical (spectral) individuality.*

Along the lines of the Schenck modification of the Young-Helmholtz theory the diffusivity results might be interpreted as showing that the primitive yellow substance is still present in the retina, as well as the red and green substances which have developed from it. Only upon the red and green substances reaching a certain depth is their equivalence with the yellow substance established. It may be imagined that this isolation is due to their going along separate channels. This interpretation practically amounts to assuming four reacting substances in the retina. The fourth is superfluous from the standpoint of colour mixture, and so appears in contradiction to the bases of the three-colour theory, which the Schenck modification is not. This throws us back, if we hold to the three-colour theory, upon the above suggestion that the diffusivity phenomena take place before the trichromatic mechanism is reached. Unless, therefore, a theory appears which is in accord with all the facts of colour mixture, but calls for a wave-length basis of colour vision, these new facts appear merely to add complications to an already too complex problem. Unfortunately, this has been the almost uniform history of research in vision.

Note added on Correction of Proof.

The transmission of colour impressions in order of wave-length, which is indicated as taking place antecedent to the trichromatic mechanism, has every appearance of being a purely optical effect. It could be accounted for by the assumption of strong chromatic aberration in annular focussing elements in the retina, concentrating the incident light on photo-sensitive fibres lying in the axes of the elements. The different periods of transmission of the various colours would then be due to the different distances the resultant decomposition products had to travel along these fibres. Further discussion of this possible explanation is deferred for the present.

HERBERT E. IVES, Ph. D.

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[3] Or possibly with the same speed for different distances. In this connection see Koenig, "Ueber die lichtempfindliche Schicht in der Netzhaut des menschlichen Auges." *Ges. Abh.*, p. 333.

DECENNIA PRACTICA—COLOUR PHOTOGRAPHY.

Under this heading we apply to the various branches of colour photography the processes of collection and arrangement accorded to some fifty departments of ordinary photography in the "B. J." during 1916. These extracts are from issues of the "British Journal Almanac" of the years 1906 to 1915, and the present series of epitomes thus resuscitates and brings together in compact form much useful information, otherwise scattered through nearly a dozen volumes.—EDS. "Colour Photography" Supplement.

SCREEN-PLATES MISCELLANEOUS.

One-Plate Colour Patents.—In an editorial review of this branch of colour photography the following summary of English patents is given. In [illegible], J. W. McDonough obtained a patent for mosaic plates produced by the use of coloured particles. Dr. Joly in 1894 protected the use of linear filters, and the following year patented the use of dyed silk fibres. The idea of utilising various media which shall not set one on the other would seem to have been also adopted by A. Baumgartner in his English patent No. 22,138, 1895, the essential of which is the production of mosaic plates by laying on the colours alternately, either by printing or in a chemical way, so that an incoherent coloured grating is first given to the plates, and then the spots or places left uncoloured are afterwards coloured by dyeing, corroding or etching. It is impossible to differentiate between what we have termed "mosaic" and "linear" processes, for the two naturally run one into the other, the derivation of mosaic structure from the linear being a natural method of overcoming the sometimes too obtrusive character of the lines. In addition to the above-mentioned patents, we have No. 8,930, 1896, of Brasseur and Sampolo, in which geometrical figures are specifically claimed. A further patent is No. 12,645, 1896, of McDonough, in which also dots, lines, and figures, or other regular recurring patterns are claimed. We then come to the starch grain process of MM. Lumière, Patent Nos. 22,988 and 25,718, 1904, and 9,100, 1906. On p. 850, "B.J.A.," 1907, will be found also No. 6,881, 1906, the patent of Dr. J. H. Smith, of Zurich, for different patterns of colour screens, built up of triangles, hexagons, or rhombuses, so as to fit together without intervening spaces. In the same article are described the suggestions of Señor Ramon y Cajal and the French patent No. 357,928 of MM. Berthon and Gambs for obtaining mosaic or linear colour filters by weaving.—"B.J." (Colour Supplement), Feb. 1, 1907, p. 13.

Catalytic Methods of Screen-Plate Photography.—Carl Schinzel contributes to the "Chemiker-Zeitung" a lengthy paper of a suggestive nature, in which methods are described apparently with the intention of pointing out future possibilities in them.—"B.J.," (Colour Supplement), Aug. 7, 1908, p. 61.

Screen-plate Colour Prints.—E. C. G. Caille has patented the use of a fourth screen structure, or network, in obtaining colour prints by the screen-plate method on opaque supports, such as paper. —Eng. Pat. No. 15,935, 1912.—"B.J.," Aug. 15, 1913, p. 635.

J. M. Child has patented a printing frame specially designed for the copying of screen-plate colour transparencies. English patent No. 10,802, 1908.—"B.J.," Sept. 11, 1908, p. 702.

TWO-COLOUR AND FOUR-COLOUR PROCESSES.

Schering Process.—The Chemische Fabrik auf Aktien, vormals Schering, have patented a method for preparing printing material for Gurtner's two-colour process of colour photography, for which two negatives are taken, one through a violet, and the other through an orange filter. From the yellow negative a print is taken on P.O.P. and [illegible] with ammonia which gives a yellow image. From the blue negative a positive is made on a chloro-bromide emulsion coated on celluloid, so that it can be stripped; this being the essential point of the patent. This black positive is then converted into a blue image by treatment with ammonia-citrate of iron 0.5 parts, glacial acetic acid 50 parts, potassium ferricyanide 0.5 parts, water 200 parts. The blue positive is then washed in acidulated water and superimposed on the yellow image, dried, and the celluloid stripped.—Ger. Pat., No. 169,313, May 4, 1905.

Henberger Process.—A two-colour printing process of J. K. Henberger consists in coating an ordinary piece of silver chloride printing paper with a film of indiarubber, and to this applying a coat of gelatine. The negative to be printed yellow is made reversed, laid on the gelatine film of the paper, and exposure made as for silver paper. The print is washed in cold water for about half an hour, and is then given its yellow colour without drying by means of a 25 per cent. aqueous ammonia solution. The yellowing takes place through the uncoated paper (the back of the print), the print being fixed in frame and protected at the edges with strips of paper while the ammonia is applied. The action takes place in a few minutes; the print is then washed and dried. The gelatine surface is now sensitised with a ferro-prussiate mixture, and an image in Prussian blue obtained through the second negative.—Ger. Pat., No. 171,072, 1905; "Phot. Ind.," Aug. 22, 1906, p. 850

Donisthorpe Method.—F. W. Donisthorpe has patented a process based on the observation that if a negative which has been exposed through a light-filter of one colour—red, for example—is placed in contact with, and the image superimposed with a positive transparency from a negative taken through another colour—green, for example—the two pictures exactly counteract each other in all parts which contain no colour—such as blacks, whites, greys, and all shading; that which is black in the negative would be white in the positive, and *vice versâ*, thus viewing through the two images superimposed would give no image at all.

When colour is present we get a different effect. Those parts on the red negative are not counterbalanced by the green-sensation positive; for instance, a green object would be white on the red-filtered negative, and also white on the green-filtered positive, and the red objects would be black on both, and other colours tending more to green or more to red would come out more or less black on one or the other of the images. The result is that a print taken through the combined negative and positive will have the colouring matter only in black and white, everything else having been counteracted by the two images cutting each other out.

The prints taken through the two superimposed images will give the red parts as pure white, the greens as pure black, and the between colours as darker or lighter greys. Now if we take this print and place it in a bath which will tone it green, and at the same time render the silver image impermeable to aqueous dyes, and then place it in a red dye bath, we get the blacks of the image toned green and the whites red, the greys a little of green and a little of red, a combination which gives grey. The darker and lighter shades in the toned print take more or less red dye according to the colour of the photographed objects, giving more greenish or more reddish shades. This turns the print back into the colours which were originally filtered through the two light-filters; in other words it gives a representation of the colouring matter only. Now, if such prints are placed in contact and superimposed with black and white positives taken from red and green filtered negatives, we get the whole picture in natural colours—the green and red print giving the colouring matter, and the other the blacks, whites, and shadings.—Eng. Pat. No. 7,368, 1913; "B.J.," June 26, 1914, p. 503.

The Zander Four-Colour Process.—C. G. Zander bases a process of reproduction in colours on a theory of four fundamental colours—viz., red, yellow, green, and blue, by mixtures of which in suitable proportions any colours in nature can be matched or reproduced. The hues of these four fundamental (or monochromatic) colours, red, yellow, green, and blue may in popular terms be approximately described as follows:—

Magenta red,	Emerald green, and
Lemon yellow,	Ultramarine blue.

It will be found that magenta red (we use this name for the lack of a more scientific one) is one of the constituent colours of spectrum red (magenta red + yellow), and also of spectrum violet (magenta red + blue).

The four fundamental colours can be grouped into two pairs of complementary colours, viz.:—

Red and green,
Yellow and blue,

so that when the elements of either pair are mechanically mixed as pigments, by printing or staining, they produce black, while the effect of their optical combination, produces the sensation of white light.—"Penrose's Pictorial Annual," 1905-6, p. 9.

The allowable variation in the four fundamental colours and the spectral position of the preferred colours are best expressed by reference to their wave lengths. Thus for the yellow may be used any or all of the hues having wave-lengths between 6,000 and 5,600; for green, any or all of the hues having wave-lengths between 5,500 and 5,000; for blue, any or all of the hues having wave-lengths between 4,900 and 4,200; while the limits of the red are defined by the complementary colour of any or all of the hues of spectrum green between wave-lengths 5,500 and 5,000. The preferred hues may similarly be defined to those corresponding to wave-lengths 5.890 (about D line), 5,220 (about E½ *b*), and 4,580 (about F½ G), together with the colour complementary to that of wave-length 5,220.

It is advisable in these colour records that there should be overlapping in the green and red records in the region both of the D and of the G lines, and in the yellow and blue records in the region of the lines E and *b*. These overlappings, the extent of which is discretionary and may be determined empirically, produce corresponding gaps at D, G, and E to *b* in the positives, whereby the production of the yellow, spectrum green and blue respectively may be effected.—Eng. Pat., No. 27,023, 1904; "B.J.," Jan. 5, 1906, p. 14.

Four-Colour Photography.—A. von Hübl, writing on this subject, states that it is impossible to obtain perfectly true results by four printings, because, generally speaking, in each of the three negatives three colours must always act like white and the fourth like black, but this is an impossibility, and the colours will always be degraded by a complementary pair of colours, and will, therefore, appear more impure than in three-colour photography. The theory is correct, but it assumes the ideal printing inks, which do not exist. There is also much more trouble with four-colour photography, and, of course, greater chance of errors and want of register. In spite of the above-described failings of the four-colour process, it does not preclude the fact that it can sometimes give better results than three-colour printing, only there must be considerable fine-etching of the printing plates. This must be done on all four plates, and is considerably more than is necessary with three-colour work. Without this manual help the process cannot be employed, and for this reason also four-colour photography is valueless for carbon and gum printing.—"Wien. Mitt.," June, 1906, p. 179; "B.J.," Aug. 31, 1906, p. 693; 1907, p. 853.

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AUTOTYPE THREE-COLOUR PRINTS.—The Autotype Co., 74, New Oxford Street, London, W.C.1, have just issued a new price list of their trichrome tissues, and have embodied with it instructions for the working of the process which, as colour workers will confirm, has on the whole stood the test of time in its own field better than any of the many other methods

PREVENTING FRILLING OF AUTOCHROMES.—I had great trouble with frilling until I learned how to overcome it absolutely. I have a 10 by 16 tray which I fill half an inch with water at 65° F. In this tray I place my two smaller 4 by 5 trays, one holding developer and the other the potassium bichromate reversing solution. I use this solution at double strength in summer—that is, one dram of the bichromate of potash to thirty-five ounces of water, and reverse for one and one-half minutes. By keeping the small trays in the large tray of water the temperature of the two solutions will remain constant. I place the plate in the developer, count one hundred and fifty (two and a half minutes), rinse plate in the water in tray, then transfer it to the reversing solution, and come out into the daylight. I never take up the plate to judge its density, as the warm fingers will change its temperature, and frilling will result. After reversal, I wash the plate for thirty seconds or less in water from the tap or in a separate tray of water. It is dried quickly, an electric fan being a great help. I frequently develop at night, using a 25-watt electric light bulb for daylight. When the plates are dry, I use black lantern-slide binding tape instead of a regular black mask, as by the use of tape I am better able to "trim" my picture. The finished plates are mounted with cover-glass and edges bound with the black paper tape.—T. W. Kilmer in "Photo. Era."

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ON

Colour Photography.

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AUTOCHROME FRAMES AND A FEW HINTS.

[In the following notes from "Abel's Photographic Weekly" an American writer describes various patterns of frame for holding and viewing Autochrome transparencies. His suggestions may perhaps be utilised by those whose interest in Autochromy is at present limited to contemplating the renewal of practical work when facilities for the process shall have been restored.—Eds. "Colour Photography" Supplement.]

The following lines are notes from my own experience. In reference to the Auto-frame, I do not claim anything original but it is something I had never seen nor heard referred to.

I have purchased every design of Autochrome case on the market, and some of them are so cheaply made and are so shoddy in appearance that it would make an Autochrome look cheap indeed to be encased in one.

We have illustrated with this article cuts Nos. 1, 2, 3, 4, 5, and 6. Nos. 1, 2, and 3 represent a mahogany easel frame with 5 x 7 opening. I had a mahogany carrier or mat with 4 x 5 opening made for it; also a moulding 5 x 7 containing a mirror that is hinged to pedestal of easel at base and held at any angle desired by a very small chain whose links are slipped over small pin in top of easel post. Autochrome is backed by ground or plain glass and backed up with *mat* (on back of frame)—to match the wood.

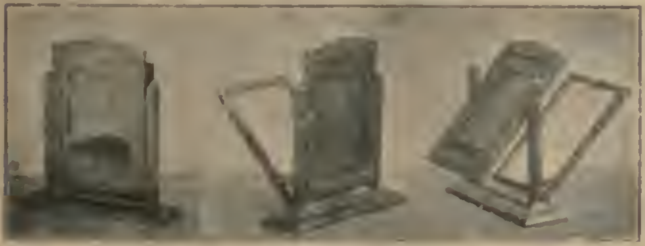

Fig. 1. Fig. 2. Fig. 3.

In cut No. 1 frame is shown closed when on the mantel, table, or dresser; cut No. 2, mirror partly let down; cut No. 3 represents Autochrome frame and mirror in well-balanced position.

In cuts Nos. 4 and 5 the easel and frames are of silver bronzed wood; cut No. 4 shows easel closed, showing how mirror is backed and hinged, also supported with metal extension to help the balancing of weight. Cut No. 5 shows frame, easel, and mirror in correct position for viewing the Autochrome.

Cut No. 6 represents three different plain easel frames, opening 4 x 5, *without mirror*. They can be stood on mantel, table, dresser, in miniature cabinet, or elsewhere. In order to view the Autochrome, simply pick up the frame and hold between your vision and the light; nothing strange in that, you carry other photographs to the proper light in order to view them; you

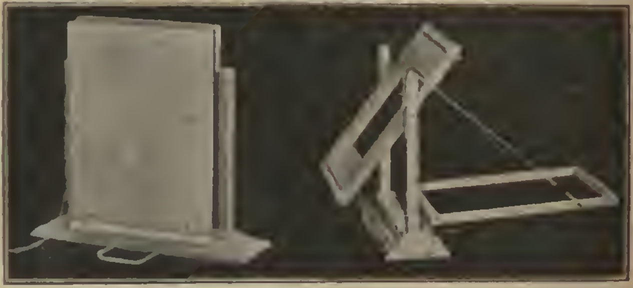

Fig. 4. Fig. 5.

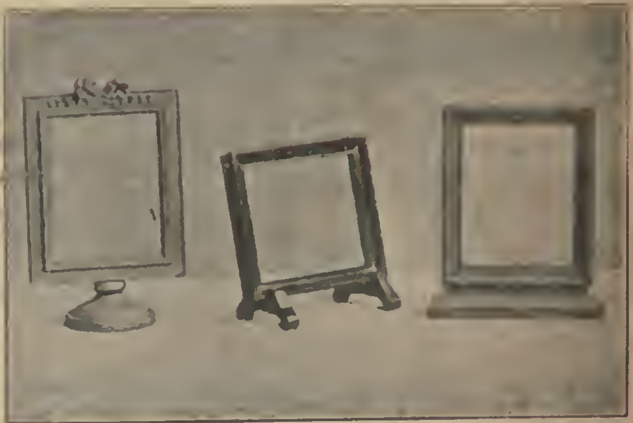

Fig. 6.

can't view them to advantage in an improper light, can you? What is the difference between looking *through* a picture (transparency) or looking *at* a picture (photograph) direct?

In my opinion (although I have never had one made) the Doretype Case, made by Tapprell-Loomis Co., would be an ideal Autochrome case, providing the back was swung in a loose-leaf manner as the front is, also *both sides of the centre* finished facsimile, thus you could mount the Autochrome in a finely finished case and by opening both front and back and holding up between your vision and the light, you could easily show the Autochrome to advantage.

The same case could be used as a double case for two photographs placed back to back.

In my work I develop in absolute darkness at temperature of 65° F., time 2½ to 3 minutes, and dilute the developer about one-third more than the recommended formula.

In the technical sense the correct timing of the Autochrome plate is the most difficult of all of the manipulations. In other words, if your judgment of the "*time*" has been correct, all other proceedings are simple and easy.

All Autochromes are, of course, dated for only three months, and I would advise fresh plates for portraits; but I also have used plates that were out-dated over a year, and secured the best results with near perfect colour rendition. With old plates the time required will be longer than with fresh plates; and I always employ the older plates for still life and pictures of garden, lawn, and house and lawn together. The formulas for intensification and reduction as recommended by the Lumieres are the best, and can be used to great advantage with overtimed and undertimed plates. The prices asked and secured for Autochromes depend entirely upon the photographer and his patron; the reputation and ability of the one, and the appreciation and pocket-book of the other.

B. Rundle.

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THE BLEACH-OUT PROCESS.

Chloral Hydrate Sensitiser.—Dr. R. Neuhauss has investigated the effect of the physical character of the dye solutions on the rapidity of bleaching, using Siedentopf and Zsigmondy's ultra-microscopic method. He found that frequently one film of certain intensity was much less sensitive than two films superimposed, each of half the intensity. Many dyes show fine and coarse particles, and also a diffused colour, differing from the actual colour of the dye, and this increases with age and lowers the sensitiveness of the dye.

Chloral hydrate has been found to be the best sensitiser, and its action is increased by the addition of caustic soda, and 2 per cent. of chloral hydrate, with 10 drops of a 10 per cent. solution of caustic soda, should be used. The exposure is reduced to one-fourth. Attempts were made to do away with gelatine as the vehicle, and the best results were obtained with a solution of celloidine in glacial acetate acid, with a few drops of turpentine as an accelerator; unfortunately erythrosine cannot be used with this, and no satisfactory red dye was found. Neuhauss has found that the prints can be sometimes developed by repeatedly and momentarily dipping them into hot water, but this does not always succeed. The best results were obtained by treating them with 10 per cent. solution of potassium iodide, to which a few drops of chloride of gold solution were added; sometimes it was advantageous to subsequently treat the prints with hypo. The sensitiveness of prints thus treated was so lowered that they were practically fixed.—"Eder's Jahrbuch," 1906, p. 11.

Uto Paper.—Baron von Hübl, writing on Uto paper, made by Dr. Smith, of Zürich, states that it has a gelatine film containing erythrosine and on the top a green collodion, formed by a mixture of blue and yellow dyes. The latter film contains anethol as a sensitiser, but the red film requires sensitising with hydrogen peroxide. A specially prepared paper is used into which the red dye does not diffuse. The unsensitised paper does not become white, even with very long exposure, but assumes a crimson red colour, for only the green film bleaches. After sensitising with the peroxide, the dyes bleach fairly evenly, and, under favourable conditions, prints, true to the original, with pure grey tones, can be obtained. The activity of the hydrogen peroxide soon decreases, and completely ceases when the paper becomes dry. The prints must thus be finished before the paper becomes dry, therefore one can only print in direct sunlight. In the shade only red prints are obtained, and also a piece of paper exposed by itself will not turn white, but remains red, as it dries before the complete bleaching of the erythrosine film. The paper only remains damp sufficiently long to completely bleach when in intimate contact with the original. If the paper, therefore, is not used soon after sensitising, or the light decreases during the exposure, reddish tints are produced. In such case supplementary sensitising may be resorted to. The printing frame should be opened and the back of the paper covered with a sheet of blotting-paper, soaked in hydrogen peroxide, and half dried. As the damp "Uto" paper adheres tolerably firmly to the original, one need not fear any movement. On the other hand, a freshly sensitised paper may give greenish tones in very strong light, for the red film bleaches too quickly. In this case it is advisable to cover the printing frame with a sheet of glass, coated with erythrosine collodion.

The necessary time of printing depends essentially on the intensity of the dye films. If these are thinly coated an exposure of from 20 to 30 minutes is enough in sunshine. In this case the paper shows only a dark grey colour, which, however, in the finished prints, is almost as good as black. If, on the other hand, the dyes are thickly coated, the paper appears, before exposure, black, and then an exposure of an hour or more is requisite. The fixation of the coloured prints presents no difficulties. The hydrogen peroxide is destroyed by complete drying of the picture, and in order to remove the anethol several hours' soaking in benzole is required.

The pictures obtained by means of the bleaching-out process actually deserve the designation of "colour photographs," for actual dyes give the colours, and these are directly produced by the action of light.—"Wien. Mitt.," September, 1906, p. 291; "B.J.," October 5, 1906, p. 778.

Dr. R. Neuhauss, commenting on this paper, prepared by Dr. Smith, of Zürich, says:—The colour is almost black, the best proof that the colours used are well selected. If this paper is printed under a coloured transparency, the colours are reproduced with striking accuracy. The paper is, however, very insensitive, which is caused by the method of sensitising. Ethereal oils, in this case anethol, do not give anything like the sensitiveness of hydrogen peroxide. They have, however, the advantage of giving preparations that will keep and which require no further treatment before exposure. Anethol is an unpleasant addition, on account of its persistent smell. Worel, who introduced it as a sensitiser, obtained the best results with this of all the essential oils tried. In the author's experiments turpentine proved more satisfactory. Colours from different sources, however, act differently with different sensitisers. Lately Arthur Berger, of Dresden, has stated that he has obtained the best results with a mixture of three parts of alcohol and one part of turpentine, vigorously shaken up together in daylight.

So long as only paper prints are required, the ethereal oil will suffice as sensitisers; if, on the other hand, exposures in the camera are desired the mixtures are much too insensitive. A sensitiveness about ten times greater is obtained by mixing the dyes with hydrogen peroxide, chloral and caustic soda (see "B.J. Almanac," 1907, p. [illegible], as suggested by the author. Yet the sensitiveness of this mixture is not sufficient for exposure in the camera.—"Phot. Rund.," February, 1907, p. 20; "B.J." (Colour Supplement), February 1, 1907, p. 14.

C. W. [illegible] finds that it is sufficient to remove the sensitiser after printing. This is effected by means of the "Uto" fixing bath, or simply benzole, which dissolves the anethol from the film. With only two minutes' bathing with benzole there was a reduction of the sensitiveness such that on exposure of an uncovered strip for [illegible] there was only a faint bleaching of the yellow. It is possible, by using a coloured screen in front of a transparency, to obtain monochrome pictures on a coloured ground. The sensitiveness of the glossy and matt papers is approximately the same. The prints with the glossy paper are far superior to the matt; the latter always appears as though covered with a ground glass, and, though in many cases it shows truer colours, they are always duller than the glossy.—"Phot. Ind." March 6, 1907, p. 271; "B.J." (Colour Supplement), April 5, 1907, p. 28.

Improvements in the "Uto" Paper.—Dr. J. H. Smith, in some notes on recent experiments of his on the making of "Uto" paper, states that he has traced the alteration in sensitiveness to different colours, which takes place on keeping, to the volatility of certain sensitisers. This can be overcome by adding substances capable of binding the sensitisers, although this cannot be done completely, and it may be advisable to pack the sensitive paper in tinfoil. In printing from Autochromes on "Uto" paper the latter may become so heated that the waxy vehicle of the starch grains actually melts, mixing up the colours and converting the Autochrome into a positive in black and white. This difficulty is overcome by conducting a spray of water upon the cover glass of the printing frame during exposure. It is found that the sensitisers are more thoroughly removed by vaseline oil than by benzole, as formerly directed, or a solution of the oil in benzole is employed.—"B.J." (Colour Supplement), September 4, 1908, p. 68.

Selective Absorption.—Dr. C. E. K. Mees, from measurements of the "Uto" bleach-out paper made by Dr. J. H. Smith, finds that the light reflected from the surface is not of the same composition as that reflected from white paper, but contains two maxima of light with three absorption maxima between, the latter evidently corresponding to the three dyes: the first at 6,700 to a blue-green, possibly methylene blue; the second at 5,600 to a magenta red; whilst a third in the violet is indicated at somewhere between 4,000 and 4,[illegible]. From actual exposures of the paper in the spectrophotometer it was seen that any one maximum can be bleached out by light of the colour which is absorbed falling upon it.—"B.J." (Colour Supplement), March 6, 1908, p. 17.

Bleach-Out Properties of Dyes.—P. Lazareff, in a paper on the examination of the bleach-out action of light on cyanin, pinachrome, pinaverdol, lepidin-cyanin, and chinaldin-cyanin, concludes that, within errors of observation, the decomposed dye in an absorption band is directly proportional to the absorbed energy and independent of the wave-length of the incident light. Only a small fraction of the absorbed radiant energy is used in the photo-chemical decomposition of the dye; the larger part is spent on warming the absorbent film.—"B.J." (Colour Supplement), May 1, 1908, p. 38 (from "Annalen der Physik").

Bleach-Out Sensitiser.—Dr. J. H. Smith states that he has discovered a new sensitiser for bleach-out dyes giving enormously greater sensitiveness than anethol. A paper prepared with it should be double the speed of P.O.P.—"B.J." (Colour Supplement), March 5, 1909, p. 23.

Dyes for the Bleach-out Process.—Dr. W. Merckens, in a paper appearing in the "Revue Technique et Industrielle," states that from experiments on dyes and colloid bodies it appears that dyes of acid character, or containing acid radicles in their constitution, possess an affinity for gelatine and albumen. Among these are erythrosine, diamine blue 6G, and naphthol-yellow. Dyes of a basic character more easily impregnate cellulose and its derivatives. Among these are saffranine, methylene-blue, and auramine. The simplest method of preparing a bleach-out paper is to employ three dyes of acid character in gelatine on collodionised paper, or three basic dyes in collodion on a gelatine or baryta-coated paper. The drawback to saffranine for the red colour is that it leaves a brownish residue of colour, but later experiments of the author have led to a suitable dye.—"Phot. Couleurs," Nov., 1908, p. 269; "B.J." (Colour Supplement). Jan. 1, 1909, p. 1.

Sensitisers and De-sensitisers for Bleach-out Dyes.—Dr. J. H. Smith has examined a number of bodies (desensitisers) which do not aid the bleaching-out of dyes for "Uto" paper, but, on the other hand, reduce the speed of bleaching of one or more dyes or counteract the action of sensitisers, in both cases frequently to an enormous extent. Volatile oils fall into one or other of these classes. Using basic dyes contained in nitro-cellulose, the presence of a diffusing body, such as glycerine or castor oil, is necessary in order to bring out the action of the sensitisers. A sensitiser which is also a solvent of the collodion film will exert its action, but otherwise will not accelerate the bleaching of the basic dyes. The best sensitiser is anethol.

Other important sensitisers are the oils of:

Cassia,
Cedar leaves,
Cedro
Cinnamon,
Citronella,
Mustard,
Peppermint,
Pine,
Sage,
Spike,
Spruce.

The following oils were strong desensitisers:

Carraway oil,
Oil of origanum,
Clove oil.

It is frequently found that small proportions of a powerful desensitiser will destroy the sensitising action of a moderate sensitiser. Among chemical compounds eugenol and isoeugenol are the most energetic desensitisers, then follow carvacrol and thymol.

Bodies of the aldehyde class usually yield strong sensitisers.

As almost all sensitisers are volatile, it appears necessary to pack manufactured bleach-out paper in tinfoil, and also by covering the surface of the paper with a gelatine coating to imprison the sensitisers until the print has been made, the gelatine film being then stripped off before fixing and finishing the colour copies.—"B.J." (Colour Supplement), Nov. 6, 1908, p. 81.

Chemistry of the Bleach-out Process.—Dr. K. Gephard has found that in the bleaching-out of mixtures of dyes the action of sensitisers varies with—

1. The nature of the dye to which they are added.
2. The presence of other dyes or salts.
3. The medium or substratum in which they are dissolved.
4. The relation of their concentration.

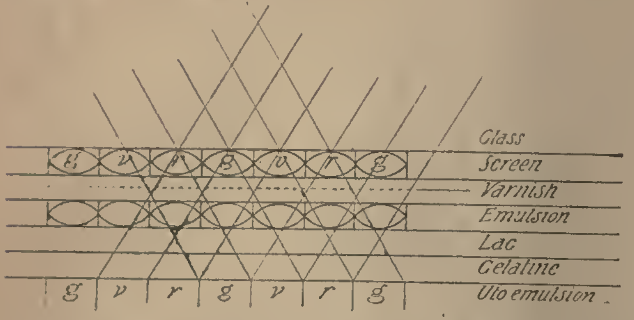
Various sugars accelerate, whilst gums retard. Albumenoid substances accelerate, whilst bodies of alkaloid or aldehyde constitution act as retarders. An important point in the bleach-out process is that, in order to ensure the fixation of the image, the decomposition product of the dye should be removed as well as the sensitiser.—"B.J." (Colour Supplement), Apr. 2, 1909, p. 32.

Bleach-out Colour Photographs.—According to a German patent (No. 209,933, of September 20, 1907), taken out by Dr. H. Stobbe, of Leipsic, it has been possible to prepare a series of dyes, the so-called fulgides, which are converted most rapidly into colourless compounds on exposure to light. This change takes place with greater rapidity when the fulgides are dissolved in ether, acetone, petroleum-ether, chloroform, benzole, gelatine, or acetone-collodion, or when they are supported in a collodion or celloidine film on paper or other cellulose body. Addition of iodine, nitro-benzole, phenol-ethers, or ethereal oils hastens the process to such an extent that the bleaching-out action is complete in a few seconds. The fulgides can therefore be mixed with equally sensitive blue dye for the preparation of multicolour prints by the bleach-out methods.

Printing Frame for Bleach-out Copies from Autochromes. Dr. J. H. Smith has worked out the data necessary when using the mirror printing frame suggested by him for accelerating the printing of Autochromes on bleach-out paper, namely:—

(1) The best angle in which to place the mirrors.
(2) The correct length of the mirrors.

Taking the dimensions of the Autochrome plate (in section) as follows: thickness of filter screen, 1-100 mm.; varnish, 1-100 mm.; emulsion, 1-100 mm.; protective varnish, 1-100 mm., and assuming the "Uto" paper to have a gelatine coating of 1-100 mm., and further, that the average diameter of the coloured patches is 2-100 mm., it can be shown that the mirrors placed round the Autochrome transparency should include an angle not greater than 75°, which angle, for all four mirrors, is calculated to give an increase of light of nearly 4½ times, thus greatly reducing the time of printing.



The other difficulties in the printing of Autochromes arise from the heating of the Autochrome during printing and from the necessity of keeping the plane of the Autochrome at right angles to the sun's rays. As regards the first, a varnish of gun-cotton in amyl-acetate is used in place of the resinous varnish, and the printing frame is also provided with a fine water spray, which keeps the surface of the Autochrome cool during printing. A metallic frame is cemented round the plate to keep the water from penetrating into the interior of the frame.

In order to keep the frame at right angles to the sun's rays during printing, a sheet of metal is introduced upon which the contour of the shadow of one of the mirrors when in proper position is indicated.—"B.J." (Colour Supplement), Jan. 1, 1909, p. 2.

The apparatus is patented by J. H. Smith and W. Merckens in Eng. Pat. No. 15,937, 1907.—"B.J.," Aug. 27, 1909, p. 676.

Trichromy by the Bleach-out Method.—H. Quentin suggests that makers of bleach-out papers should supply three separate papers, each giving a different colour, and prepared so that the three images could be combined by stripping.—"Phot. Couleurs," July, 1909, p. 153; "B.J." (Colour Supplement), Oct. 1, 1909, p. 78.

Bleach-out Literature.—Dr. J. H. Smith, in a paper before the Royal Photographic Society, reviewed past literature of the bleach-out process, and described his own later experiments in producing a more sensitive and colour-true paper of this type.—"Phot. Journ.," April, 1910; "B.J." (Colour Supplement), May 6, 1910, p. 34.

Fulgide Bleach-out Dyes.—Dr. H. Stobbe has described experiments with fulgide dyes[*] in the bleach-out process. Suitable red and yellow fulgide dyes were found, but dicyanine was used as the blue dye. Nitro-benzene was found to be the best sensitizer.—Eden's "Jahrbuch," 1910, p. 161; "B.J." (Colour Supplement), Dec. 2, 1910, p. 91.

Thiosinamine Sensitiser.—Dr. J. H. Smith has patented the use of thiosinamine as a sensitiser of dyes used in producing bleach-out colour paper. The thiosinamine may be added either directly to the bleach-out emulsion or be subsequently combined with the dyes by means of baths or in some other manner. It may, if necessary, be also produced directly in the emulsion through the action of ammonia on allyl-mustard oil, the product of this union being, as is well known, thiosinamine: *e.g.*, the two ingredients may be mixed in definite proportions with the emulsion, either consecutively or each to a separate portion of emulsion, and these portions then mixed together afterwards.

The above description applies also to the use of thiosinamine for increasing the action of dyes employed in sensitising silver haloid emulsions.—Eng. Pat. No. 5,154, 1910; "B.J.," March 31, 1911, p. 239.

Thiocarbamide Sensitisers. Dr. A. Just has experimented with various compounds derived from thiosinamine for obtaining extra rapidity of bleaching dyes. Of these new sensitisers di-ethyl-allyl-thiocarbamide appears the best. Its excellent property of crystallising permits of its being readily obtained in great purity. It is very soluble in alcohol and benzole, a point of advantage, inasmuch as benzole thus serves excellently as a fixing agent for the finished colour prints, the sensitiser being dissolved out and the colours being left behind. Since the sensitiser is not soluble in water, it is more suited for collodion films than for those of gelatine.—"Phot. Korr.," April, 1913, p. 168; "B.J." (Colour Supplement), July 4, 1913, p. 26.

Lumière Bleach-out Paper.—MM. Lumière have patented a method relating to the manufacture of bleach-out paper. The paper is impregnated before exposure with solutions of hypochlorites, hypobromites, or hypoiodites, with addition of chlorides, bromides, or iodides of the alkaline or alkaline-earth metals. Thus, a paper may be prepared with a mixture of red, yellow, and blue colouring matters, such as erythrosine, anthracene, and methylene blue, and be subsequently immersed in a solution of eau de Javelle. Among the hypochlorite compounds suitable for the process are those of sodium, potassium, barium, strontium, magnesium, aluminium, or zinc. The concentration is so chosen that in using sodium hypochlorite about 25 to 30 per cent. strength (in chlorine) is obtained in the solution. The paper after this treatment is exposed whilst still moist under the coloured original or Autochrome. The bleaching-out action takes place quickly. The print is fixed by destroying the sensitiser. For this purpose it is immersed in a reducing solution, such as sodium sulphite, soda bisulphite, or ammonia, as an alternative to which latter the paper may be fumed with ammonia vapour.—Ger. Pat. 258,241 of Dec. 6, 1911; "Chem. Zeit.," May 17, 1913, p. 276.

Additions to Bleach-out Paper.—Dr. J. H. Smith has patented the addition of certain alkaline salts of polybasic acids to the coating of dyes used for bleach-out paper in order to obtain more even bleaching-out of the colouring matters. Suitable salts are the alkaline phosphates and citrates, which may be mixed with the dye emulsion, or applied by bathing the coated paper.—Ger. Pat. No. 262,163, of Oct. 13, 1911.

Fixing Bleach-out Prints.—Dr. R. Stahl has patented the treatment of bleach-out colour prints obtained with dyes which have been sensitised by means of thiosinamine. After the bulk of the sensitiser has been removed by washing with water or alcohol, the residue is decomposed by means of an acid solution of a nitrate. For this purpose the bleach-out print, prepared with a gelatine emulsion, is first soaked in water or weak alcohol and then transferred into an acid solution of sodium nitrate in weak alcohol. In this the thiosinamine is decomposed and the products dissolved out of the film by the alcohol, the print being finally washed. A similar procedure is used in the case of collodion bleach-out prints. Any excess of nitrous acid is removed by application of a solution of thiocarbamide, followed by washing. Fixing agents may be added to the desensitising baths.—Ger. Pat. No. 264,492 of July 12, 1912; "B.J." (Colour Supplement), Nov. 7, 1913, p. 44.,

Bleach-out Dyes.—Dr. A. Just has patented the use of colouring matters of the chinoxalin series, and in particular flavindulin, as dyes for the yellow. They are found to be highly permanent and readily sensitised by means of such substances as anethol, thiosinamine, etc. They are best prepared by the action of orthodiamines on diketones. Flavindulin is sensitised to an even greater speed of bleach-out effect than methylene blue.—Ger. Pat. No. 263,221, of Feb. 13, 1913; "B.J." (Colour Supplement), Nov. 7, 1913, p. 44.

* * *

SENSITISED PAPER FOR COLOUR PHOTOGRAPHY.—Mr. F. J. Shepherd, of Kilcorrel, East Molesey, applied in the Patents Court for licence to use the German patent 2,562, of 1913, in the name of Dr. Rudolf Fischer, of Berlin-Steglitz, for the manufacture of sensitised paper and photographic developers which would yield a permanently tinted photographic print. The Comptroller of Patents (Mr. Temple Franks) said the licence could be arranged on the conclusion of royalty terms, but he thought the terms should also protect the users of the developers who bought the special paper that Mr. Shepherd would manufacture and sell under the patent. He would report to the Board of Trade in due course.

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[*] "Berichte," 1904, pp. 2,232, 2,240, and 2,556; 1905, pp. 3,673, 3,682, 3,893, 3,897 4,075, 4,081, and 4,087; 1906, pp. 292 and 761.

"Verhandlungen der Gesell. Deutsch. Naturforscher," 1908. Part II., pp. 83 and 112, and "Zeitschrift für Electrochemie und angewandte physikalische Chemie," Vol. XV., 1908, pp. 474 and 482.

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ON

Colour Photography.

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ADDITIVE AND SUBTRACTIVE COLOUR PROCESSES

Several requests having been recently made to us for some explanation of the essential distinction between the forms of colour process which are commonly referred to as "additive" and "subtractive," it may be of interest to others besides our correspondents if we print a few notes dealing with the theoretical conception which underly these processes. For that it is necessary to go back some little way to the phenomena of colour vision, for after all colour is a subjective phenomenon, and words about colour only have a meaning in relation to our perception of colour. Now even though it may not be indisputably established, our recognition of colours by the eye may be considered as based upon a three-colour theory. There is reasonably good ground for the assumption that the eye perceives colours by first singling out the red, green, and blue-violet in colour, and then re-combining these constituent elements in order to create the sensation of a compound colour. It also is reasonably certain that the sets of nerves in the eye which perform this function are not separately sensitive with rigid sharpness to the three elementary colour rays just mentioned. On the other hand, one colour-sensation vignettes off, so to speak, into the next, but the predominant character of each is that associated with the sensation of either red, green, or blue-violet. Apparently it is still obscure by what method or process the sensation of compound colours is conveyed to our senses by the combination of these three separate colour sensations. Probably it would not be correct to refer to that process as one of addition, but at any rate this term may be applied appropriately to the physical counterpart of the process which the eye performs, such as results from the combination of coloured lights projected in super-imposition upon a screen. In these circumstances the combination of the elementary colours red, green, and blue-violet produces white, that of red and green, yellow, that of blue-violet and green, blue, whilst that of blue-violet and red produces crimson.

Here we have the basis of the so-called additive colour-processes, the first application of which along photographic lines was made by Clerk Maxwell in the year 1861. With the comparatively meagre facilities then available in the way of colour-sensitive plates Clerk Maxwell showed that by separately recording the redness, greenness, and blueness of a subject in the form of photographic negatives, by printing from each negative of the three a positive transparency, and by projecting these transparencies in superimposition, each provided with a screen of colour corresponding with that through which the respective negative was taken—by these means the colours of the subject were substantially reproduced. It will be seen that in such a process as this, which is essentially that of all additive methods, the function of the positive transparency is that of a stencil. The transparency, in other words, regulates the amount of red light, green light, or blue-violet light which shall be transmitted to the screen: regulates it, that is, in proportion to the relative quantity of these colour constituents in the original subject. Later experimenters, as will be familiar to many readers, developed this process to a state of great perfection, notably Mr. F. E. Ives, by means of the instruments known as the Kromskop and the lantern Kromskop. Yet a common feature of all the results produced by these additive methods was that, after all, they were optical effects as distinguished from concrete reproductions such as one could separately handle and distribute. Up to this time the embodiment of the additive process in a form which could be called a colour photograph had been realised only in the way of suggestion by the far-seeing French investigator, Ducos Du Hauron. It remained for Professor Joly and MM. Lumière to give practical shape to these ideas. The screen-plate in its banded Joly form or in the form of the Autochrome is thus a variation of the additive process in which combination of the three primary colours—red, green, and blue-violet—results not in the superimposition of coloured patches of these lights, but by the mingling of microscopically small areas of them. Inasmuch as the eye is unable separately to distinguish the minute colour elements (red, green, and blue-violet) in the Autochrome transparency the combination of these colours takes place by the simplest of processes. As in the Ives method the positive transparency which forms one layer of an Autochrome again plays the part of a stencil, covering such colour-elements as are not required and leaving uncovered those which corresponded with the effect of light upon the sensitive emulsion in the first instance.

When we come to subtractive methods, the rationale of the process is somewhat more complex, although the principle is in great part the same. The subtractive method depends not on mixing coloured lights but in starting with a surface which reflects or transmits white light and laying upon it, by a photographic process, pigments which will abstract such colour components of the white light as will leave coloured rays corresponding with those separately registered by the three negatives taken of the subject. As in the additive process, we start with recording the redness, greenness, and blueness occurring in the subject. It will be simpler to follow the process by taking the single instance, say, of a red. The problem is to supply pigment, to, say, a white sheet of paper such that all rays but red will be absorbed from the light reflected from it. Inasmuch as we know that red subtracted from white light leaves the two other primaries, green and blue-violet, it will be understood that to absorb these latter and to leave the red it is necessary to employ pigments which are the complementary of these two colours, that is to say pink (the complementary of green) and yellow (the complementary of blue). Thus in the case of a subtractive method the negative which records the greenness is printed in pink; that which records the blueness is printed in yellow. With the result that any part of the subject which consists of pure red receives a pink deposit from the green sensation negative and a yellow deposit from the blue sensation negative. The two together thus absorb all rays but red from the light producing a reproduction of this original colour in the subject. It must not be forgotten that these absorptive properties of the pigments employed in subtractive processes are not the only desideratum. For satisfactory results the pigments should reflect all the colours they are not required to absorb. A little consideration will show that the same kind of absorption process goes on in reproduction of the other primary colours green and blue-violet and equally in the case of all the endless combinations of all three. The process holds good in the case of both colour-transparencies and colour-prints on paper. In the one case white light is transmitted on holding a transparency up to the light or projecting it in a lantern; in the other, light passes down through the pigments and is reflected back.

DYES IN COLOUR PHOTOGRAPHY.

[A review of the employment of dyes in colour photographic processes is contained in the following extract from a paper by Dr. A. Scyewetz in the current issue of the French chemico-technological journal, "Chemie et Industrie." It will be seen that it usefully deals with the properties of dyes used in one way or another in process of obtaining photographs in natural colours.—Eds. "B.J."]

It was the two French investigators, Cros and Ducos du Hauron, who first pointed out the possibility of obtaining indirectly a photographic reproduction of colours. As is well known, the principle of their method consists in regarding all multi-colour effects as capable of reproduction by means of three simple colours, blue, yellow, and red, all colour effects being obtained by the association of several primary colours. Thus it suffices to separate by photographic means the blue, yellow, and red by making negatives of these three colours. Positives from these negatives when provided each with its appropriate colour, as by staining the positive images with suitable dyes, yield, when superposed, the effect of the multi-colour original. This process of Cros and Ducos du Hauron presented great practical difficulties, the chief of which was the perfect separation of the colours so as to obtain negatives each representing a primary colour. MM. Lumière were able to solve these difficulties by employing for the making of the negative orthochromatic plates and light-filters suitably chosen in regard to them. Inasmuch as the problem consists in obtaining negatives of the monochrome effects, the sensitiveness of each of the three plates requires to be raised not to the colour to be reproduced, but to its complementary. The colour of the light-filters is chosen spectroscopically, so that the filters transmit only the coloured rays to which each of the plates has been sensitised. The system thus consists in the use of a violet screen for the yellow and orange screen for the blue, and a green screen for the red. In the preparation of these screens the most common practice is to employ films of gelatine coated on glass and stained by imbibition in suitable dye solutions, the absorptive properties of which are judged by the spectroscope. MM. Lumière used methylene blue for the violet screen, a mixture of erythrosine and metanile yellow for the orange screen, and a mixture of methylene blue and auramine for the green screen.

The three negatives having been thus obtained, three monochrome positives corresponding with them are made by printing processes such as those based on the insolubilising action of light on bichromated gelatine, and yielding a gelatine relief, the depth of which is proportional to the action of light. In staining these gelatine reliefs with solutions of suitable dyes, the colouring matters which have been employed are chrysophene A for the yellow, erythrosine J for the red, and diamine blue for the blue. The superimposition of the three monochrome positives, presuming that the selection of colours has been perfectly carried out in the making of the negatives, thus yields a true reproduction of the coloured original. Likewise, each of the negatives may be printed in black on plates or papers coated with gelatino-bromide emulsion, and the silver images thus produced converted into colour monochrome positives. The property possessed by silver iodide of fixing a large number of basic dyes, and also some acid dyes, such as methyl violet, ethyl green, quinoline red, rhodamine, eosine, auramine, and methylene blue, first observed by the Abbe Tauleigne, and subsequently by Traube, provides the basis for a different method of carrying out the same principle. The dyes themselves in this case do not permanently stain the gelatine, and are thus removed by washing with water. The silver images, in the first instance, are converted into silver iodide by the action of a mixture of potassium iodide and ferricyanide.

Colours in Screen Plates.

One of the most important applications of dyes in colour photography is that which has been made in the preparation of the multi-colour screen-plates employed in producing colour transparencies by one exposure to light. The principle concerned in these processes is the same as that in which three separate negatives are taken and monochrome positives from them combined in registration. The colours of the subject are likewise selected by means of three screens, violet, green, and orange, but these latter, instead of being separate and independent of the sensitive plates, are arranged permanently in the form of microscopic elements on the surface of the glass which supports the sensitive emulsion, whilst they also themselves form the colours of the multi-coloured image.

As is well known, these screens are formed by juxtaposed lines coloured red, orange, and violet, in a succession of these three colours, or by grains coloured with dyes, as in the Lumière Autochrome plate. In this latter the coloured grains are those of starch, measuring 10 to 15 thousandths of a millimetre. The method of production of colour transparencies upon a composite plate, such as the Autochrome, is too well known to need repetition.

Leuco Dye Bases.

A process due to Dr. König is based on the property possessed by a large number of dyes of yielding under the action of reducing substances colourless bodies known as leuco bases. These leuco bases become coloured again under the action of light. Dr. König found that by mixing these leuco bases with nitro-cellulose the recolouration under the action of light became much more rapid and considerably more intense. It was found that the oxygen of the nitric ether of the nitro-cellulose took part in the oxidation of the leuco base. By dissolving the leuco bases in collodion there is obtained a solution which can be spread as a sensitive film upon the support, such as paper. The following leuco bases have been used by Konig for obtaining different colours:—

For blue, ortho-chloro-tetra-ethyl-diamino-tri-phenyl-methane.

For green, the leuco base of malachite green.

For red, para-leucaniline or leuco-rhodamine.

For violet, hexa-methyl-para-leucaniline.

For yellow, leuco-fluorescein and leuco-flavaniline.

The colours are fixed by means of mono-chlor-acetic acid, which forms the best solvent for a large number of the leuco bases. The maximum sensitiveness is obtained by exposing the sensitive surface through screens of glass of colour complementary to that which one wishes to obtain, whilst the minimum results from using glasses of the same colour.

Feertype Azo-Dye Processes.

The diazo and tetrazo organic compounds are susceptible of yielding with sulphite of soda molecular compounds in which the property no longer exists of forming azo dyes with amines or phenols. These diazo-sulphite compounds, if mixed with alkaline amines or phenates, become coloured in light, yielding a colour identical with that which the non-sulphited diazo compounds yields with the same amines or phenols. These bodies thus afford a simple process of producing azo colours on fabric or paper, the process being known as Feertype, from its inventor. The diazo or tetrazo compound is dissolved in water, and the amine or phenol in alkaline solution added to it. Paper is then impregnated with the mixture, dried in the dark, and exposed to light under the negative or transparent screen bearing a design to be reproduced. The compound not affected by light is removed by treating the printed image for a few minutes with boiling water in which the undecomposed compound dissolves. A considerable variety of colours can be reproduced by this process.

Diazo Decomposition Processes.

In these processes the action of light is used to decompose the diazo compounds. This decomposition takes place on exposing paper impregnated with the diazo compound under a screen or negative bearing the design. For the production of the colour, either the parts which have been exposed to light or those which have been protected from the light may be developed. In the first case the paper is immersed in a solution of a diazo compound, which, with the phenol formed by the decomposition of the diazo compound on the paper, yields a new dye, whilst the parts remaining undecomposed simply dissolve without giving rise to any coloured product. In the second case, development is done by immersing the paper in a solution of an alkaline phenolate or amine, which yields a new dye only with the portions of the image which have not been decomposed by light.

Bleach-Out Processes.

The principle of these methods was indicated by Cros in 1881. It consists in the exposure of a number of fugitive dyes to light, each dye undergoing change under the influence only of the coloured rays which it absorbs—in other words, rays the colours of which are complementary to those of the dyes. Thus blue light passes through the blue particles in a mixture of dyes, and, not being absorbed by them, produces no change, but, being absorbed by red or yellow particles, produces a certain reaction corresponding with an alteration or even complete destruction of the colour. Dr. Neuhauss, who, following Vallot and Worel, made many experiments with this process, suggested solutions of methylene blue, auramine, and erythrosine added to a gelatine solution to form the sensitive coating. Immediately before use the latter was extra-sensitised by means of a solution of hydrogen peroxide in ether. It was Worel who suggested anethol as a sensitiser in place of hydrogen peroxide, using it with a mixture of primrose, blue victoria, cyanine, cercuma, and auramine. The process, however, in spite of the very large amount of experiment which has been expended upon it, still remains in a very imperfect state.

A. SEYEWETZ.

DECENNIA PRACTICA—COLOUR PHOTOGRAPHY.

Under this heading we apply to the various branches of colour photography the processes of collection and arrangement accorded to some fifty departments of ordinary photography in the "B. J." during 1916. These extracts are from issues of the "British Journal Almanac" of the years 1906 to 1915, and the present series of epitomes thus resuscitates and brings together in compact form much useful information, otherwise scattered through nearly a dozen volumes.—EDS. "Colour Photography" Supplement.

LIPPMANN OR INTERFERENCE PROCESS OF DIRECT COLOUR PHOTOGRAPHY.

On Bichromated Films.—Gabriel Lippmann finds that an interference colour photograph made on a bichromated film requires only washing in water to fix it, the colours appearing in the wet film and disappearing on drying. If the film be treated with potass. iodide solution dried without washing, and then treated with 20 per cent. solution soda nitrate, the colours remain brilliant on drying. By transmitted light the complementary colours are seen giving brilliant negatives. The author also points out the possibility of multiplying prints in colours by contact printing, not on bichromated films, but on gelatino-bromide.—"Compt. Rend.," June 5, 1905; "B.J.," June 30, 1905, p. 505.

Dr. Pfaundler, on mathematical grounds, concludes that if two light-waves of unequal wave-length penetrate the silver bromide film, the two systems of silver separation are optically influenced. The appearance of the dark stripes predicted by Zenker shows that in the Lippmann process quite a number of colour pairs do not unite to a correct colour mixture, but are neutralised to black.—"Ann. der Physik," 1904, pp. 371 to 384.

Lippmann Process without Mercury Mirror.—E. Rothé, on the assumption that a thin film of air exists between the coating of emulsion and its glass support, concludes that the separation is enough to prevent reflection—with a difference of phase—without the aid of a mirror. In practice this was found to be the case.

The exposures given by M. Rothé were, as usual in this process, very long, *e.g.*, 30 minutes for an object in the sun, two hours for the same object in a room, and 12 minutes for the spectrum of the arc-lamp. The developer used was weak ferrous oxalate, and the image was bleached with bichloride of mercury, and again blackened with ferrous oxalate.—"Comp. Rend.," "B.J.," November 18, 1904, p. 990.

[Hermann Krone in 1891 stated that the mercury mirror was unnecessary, and merely placed a piece of black velvet in contact with the film, but he ascribed the formation of the stationary waves to a "Zickzackspiegelung" in the glass, and was led to this conclusion by his work in connection with halation.—Eds., "B.J.A."]

Colour Sensitisers.—Dr. Lehmann states that all processes hitherto given for sensitising the emulsion for this process are based on an accurate proportion of the dyes, so that without a filter compound colours could be correctly rendered. Abandoning this method, the dyes are added in such quantities that each exerts its maximum action, and Dr. Lehmann uses a compensating filter, which enables all colours and even pure whites to be obtained. For the filter three stock solutions are required:—

1. Cyanine	0.4 gms.
Alcohol	200 ccs.

To be dissolved cold.

2. Erythrosine	0.4 gms.
Alcohol	200 ccs.

To be dissolved cold.

3. Aesculine	0.4 gms.
Hot distilled water	10 ccs.

When dissolved add:—

Alcohol	190 ccs.
Ammonia, sp. gr. 0.91	3 drops.

To make the filter, stock solutions Nos. 1 and 2 must be diluted with 30 parts of water or alcohol. The actual filter which is used in 5 mm. width is:—

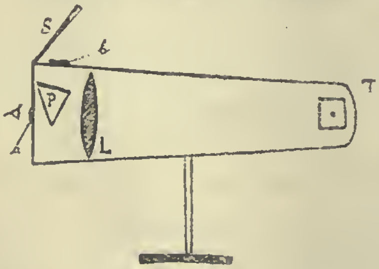
No. 1 solution (1:30)	2½ parts.
No. 2 solution (1:30)	5 parts.
No. 3 solution undiluted	1 part.
Alcohol or water	1½ parts.

The solution must be kept in the dark, as the cyanine bleaches in light. A useful substitute for the cyanine has not yet been found, though the following filter is the nearest:—

Methyl violet (1 : 15000)	0.6
Erythrosine (1 : 15000)	2.5
Aesculine (1:1500)	1.0
Alcohol	7.0

The above is a brief extract from a book, "Beiträge zur Theorie und Praxis der direkten Farben-Photographie mittels Stehen der Wellen nach Lippmann's Verfahren," by Dr. Lehmann.—"Eder's Jahrbuch," 1906, p. 49.

A Stand for Lippmann Photographs.—The Zeiss firm has introduced an apparat·s for viewing Lippmann photographs, the construction of which is shown in the accompanying diagram.



It is a long box, in the front of which are two holes for the eyes. On the top is a mirror S, which reflects the light through two holes *b* on to the total reflecting prism P. The light is then transmitted by the convex lens L on to the disc T, which can be revolved, and carries four Lippmann photographs. The focus of the lens L is such that the light falls parallel on the photographs and is thence reflected back to the eye. This is the most satisfactory arrangement, as the eye sees the pictures by means of rays which are perpendicular to the surface, and changes in the colour, by alteration of the angle of the incident light, are excluded; and as all side light is excluded the brilliancy of the colours is not reduced.

[Lippmann's original viewing box was not fitted with the prism: the mirror on the top was adjustable at varying angles, and the viewing lens was placed in the eye holes.—Ed., "B.J.A."]

Mercury Fog in the Lippmann Process.—According to Lippmann, fog is due to damp, and may be prevented by drying the plate thoroughly before placing it in the dark-slide. It should be left film up on the surface warmed to 90 deg. Fahr. for some minutes and should be placed in the slide while still warm. The mercury also should be quite dry. With these precautions the fog will not appear.—"Phot. Couleurs," May, 1907, p. 68; "B.J." Colour Supplement," July 1907, p. 55.

Lippmann Colour Photographs from Three-Colour Negatives.—Herbert E. Ives has published a method by means of which it is possible to duplicate interference photographs. The method is based on the use of three-colour records or transparencies projected by means of an enlarging lantern and sunlight, with the aid of a heliostat, on to a grainless emulsion plate, in contact with which was a grating having the opaque spaces twice the width of the transparent. When an exposure has been made with the one-colour record illuminated by the correct coloured light, the grating is shifted so as to cover the exposed line and uncover another unexposed line, and the transparency is changed and also the light. These operations are then repeated for the third colour record. It will be seen that the process may be said to be a combination of the three-colour method with the shifting grating (as described by Mr. Ives in the "B.J. Almanac," 1907, p. 845) and the Lippmann process.

Mr. Ives writes:—For coloured light three-colour screens, identical with those used in the Kromskop, were tried; a ruby-red glass, a pot-green glass, and a combined cobalt-blue and signal-green glass. These give narrow, well-separated spectrum bands, quite pure enough to give the best results.

It was soon found that much purer colours must be used than those furnished by the colour screens, for this reason. The spectrum band by which the plate was illuminated reproduced, as examination of the photograph in the spectroscope showed, as a much wider one. The triple-line pictures, therefore, instead of showing in the spectroscope three isolated bright bands, gave a continuous spectrum with slightly shaded spaces in the yellow and blue-green. This was confirmed by exposures with spectrum bands of varying width from a monochromatic illuminator. In all cases it was found on spectroscopic examination that these bands were rendered by broad, not sharply defined, ones of from five to ten times the width of the original. The most monochromatic source then at hand, a sodium flame, was photographed, and the plate showed in the spectroscope a fairly narrow band, although some red and green light was still visible. Colours as pure as that obtained in this way would be quite satisfactory for three-colour work. Suitable red, green, and blue line sources were not at the time available, so, as the best that could be done, portions of the spectrum of about eighty A. U. width from a monochromatic illuminator were tried. The coloured light was thrown on the three-colour positive, which was placed directly in front of the opaque-line screen and the plate, and so cast a shadow.

With these improvements the pictures should rank as one of the most perfect applications of the three-colour process.

The plates used were prepared according to the formula published by Valenta[1], with the exception that it was found necessary to double the quantity of gelatine; this may, however, have been due to the kind of gelatine used.[2] The pictures were mounted under a prism according to the usual method. To destroy all extra reflections possible the back of the glass and the lower surface of the prism were ground with emery before the application of asphaltum varnish to the one and Canada balsam to the other. It was further found advantageous to substitute gum styrax ($n = 1.58$) for Canada balsam in mounting the prism. By this the surface reflection from the film is less than with the balsam, and in addition (if the lower side of the prism is ground) a slight diffusion of light results, so that the picture is visible through a wider angle, and the reflected image of the source of light (such as a gas flame) no longer well enough defined to be disturbing.—"B.J." (Colour Supplement) (from "Physical Review"), February 1, 1907, p. 10.

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[1] "Die Photographie in natürlichen Farben, 1894," p. 52.

[2] "Gold Label," sold by Elmer and Amend, New York.

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